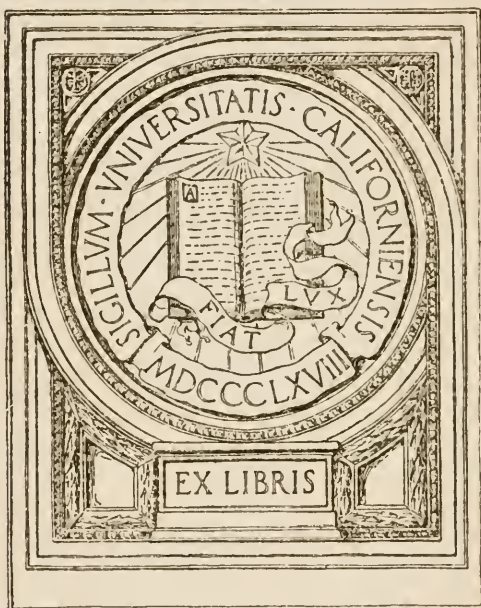


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THE UNIVERSITY OF MISSOURI BULLETIN

VOLUME 19, NUMBER 4

EDUCATION SERIES 12

CIRCULAR OF INFORMATION
TO
ACCREDITED JUNIOR
COLLEGES

ISSUED BY
THE COMMITTEE ON ACCREDITED SCHOOLS AND COLLEGES

EDITED BY J. H. COURSAULT

Professor of the History and Philosophy of Education



ISSUED THREE TIMES MONTHLY; ENTERED AS SECOND-CLASS MATTER
AT THE POSTOFFICE AT COLUMBIA, MISSOURI—1000
FEBRUARY, 1918

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INTRODUCTORY

Reasons for Accrediting

Through a closer organization of educational institutions, the efficiency of education in Missouri has increased rapidly in recent years. When the affairs of each institution were directed independently, the country elementary school did not prepare for the town high school, and the high school did not prepare for college or university. In going from one institution to another, whether of the same or of higher rank, students were seriously interrupted in their work, during a process of readjustment to different educational conditions. But this was not all. The very multiplicity of plans for education under similar social conditions was evidence of the inferiority of many of these plans. They could not all be best. The reason for this is apparent, since differences in plans were based upon differences in mere individual opinions. Organization has, in a large measure, corrected these evils. It has saved students the discouraging loss of time and energy due to interruption in educational work; it has based educational practice not upon individual opinion, but upon the conclusions of many educational experts, conclusions which, in the great laboratory of social practice, have been wisely made, thoroughly tested, and firmly established.

Until the last few years, no provision was made, however, to include in this organization private colleges that give only part of the four years' standard course of academic work. These institutions as a class did not articulate definitely with the common schools on the one hand nor with institutions offering higher collegiate and professional work on the other. It was evident that they too should become a part of the educational system, if their service to society was to be made most efficient.

The recent movement to require a two years' college course as a preparation for the work of professional schools, which in turn has made a division in the four years' course of the college of arts and science, naturally marked a definite function for colleges which did not offer four years of college work. They could give the academic preparation necessary for entrance to the professional schools or to the last two years of the college of arts and science.

Under wise leadership, a number of these private colleges were so developed as to appropriate, in a large measure, those educational standards which have been the result of a wide social experience. With slight modification, they were ready to take their place in the educational system, to fulfill the function which so naturally fell to them.

In view of this, the authorities of a number of these colleges expressed a desire, several years ago, that the place of such institutions in the system be recognized through affiliation with the University of Missouri, which represents the standards of the Association of American Universities. The University, after careful consideration, willingly coöperated with the colleges in this matter. Affiliation with the University has opened an easy pathway to further educational work on the part of the graduates of accredited colleges; it has also marked clearly for patrons of education a number of institutions which comply with the best standards. By definite service in a wider educational order which marks clearly their field of work and sets before them definite ideals, junior colleges are made free to work out their own highest salvation.

Basis for Plan of Accrediting

In formulating a plan for affiliation, the University has taken the initiative. The necessity of this is evident. As a member of the Association of American Universities, the University represents educational standards which are not of its own invention, but are the product of nation-wide experience. Furthermore, it has become closely articulated with many secondary schools of the state upon the basis of definite standards. If any particular college does not conform to accepted standards, it is logical therefore that the college should make a change rather than that the University should attempt to do so. It would be impossible for universities to have a definite educational policy, if they attempted to adapt their work to variations in a number of other institutions doing college work. Only upon the basis of uniform standards can affiliation be made, and these standards are now established.

In affiliating junior colleges, the University does not impose arbitrary conditions for affiliation; the conditions imposed are considered the logical consequences of the educational situation of which the University is only one of many factors. If the authorities of any college believe, however, that the plan presented for affiliation fails in any particular to express the logic of the situation, their criticisms will be welcomed and carefully considered.

Purpose of this Circular

The Missouri Junior College Union, an organization of junior colleges accredited by the University of Missouri, has requested the University Committee on Accredited Schools and Colleges to prepare a statement of courses with a view to standardizing the junior college curriculum. This circular is issued in response to that request. It contains a statement of the conditions for accrediting, outlines of approved courses,

and suggestions for the equipment of laboratories and libraries. Any one college is not expected to offer all of the courses outlined. It is very desirable, however, that the curriculum of each college be made up of courses selected from those described in this bulletin.

Admission to the University from Accredited Junior Colleges

Although there is a distinction between conditions for the accrediting of junior colleges and conditions for admission to the University from such institutions, some brief information with regard to the conditions for admission may appropriately be given in this introductory statement. Graduates of accredited junior colleges will be admitted without examination to junior standing in the College of Arts and Science of the University, provided they furnish certificates showing that they have satisfied the entrance requirements and the work of the first two years of this college. Such certificates will be accepted also for admission to any other division of the University except the Graduate School, if the student has completed the specific subjects required for admission to such division. For these requirements, see the University catalog. In accrediting a junior college, the approved courses are specified. Credit is not given by the University for junior college courses which are not approved.

The diploma will not be accepted as a credential. The student must present the proper form of certificate, signed by the president or dean of the college. Blank certificates will be furnished by the Registrar of the University. The certificates should be filled and sent to the Registrar of the University of Missouri, Columbia, Missouri. He will then notify the student in due time that his certificate has been approved for entrance, or that certain conditions or corrections are necessary. As the necessity for correction appears in many cases, the student will avoid delay and inconvenience by sending the certificate *as soon as possible* after his graduation. *If a student's certificate is presented later than one week before the opening of the semester, he may be required to take entrance examinations.* Certificates filed by candidates become the property of the University.

Copies of this *Circular of Information to Accredited Junior Colleges* may be secured through the office of the Secretary of the Committee on Accredited Schools and Colleges, University of Missouri, Columbia, Missouri.

CONDITIONS FOR THE ACCREDITING OF JUNIOR COLLEGES

Method of Accrediting

An institution desiring to be affiliated with the University of Missouri as an accredited junior college should present, as early in the school year as possible, an application to be accredited, blank forms for which will be furnished upon request by the Secretary of the Committee on Accredited Schools and Colleges. Since the conditions for accrediting cannot be stated with sufficient definiteness to be interpreted alike by various individuals, a committee of the University faculty will visit the institution, if the data received on the blank seem to indicate that the college complies with the conditions for accrediting. Each junior college can thus be tested by the same standards that are applied to other similar institutions. No junior college will be accredited until the report of the Visiting Committee has been passed upon by the University Committee on Accredited Schools and Colleges. It is the policy of the University to keep in close touch with accredited junior colleges through annual visits by the Visiting Committee. *The University reserves the right to cease to accredit at any time a college that employs inefficient teachers or that otherwise fails to maintain the required standard.*

General Regulations for Accrediting

The *minimum* requirements which a junior college must meet in order to be accredited are as follows:

1. The requirements for admission to the work of the college must be the equivalent of those of the College of Arts and Science in the University of Missouri.

High school subjects which are required for admission are designated in terms of "units." A unit is the equivalent of a subject pursued five forty-minute periods a week for at least thirty-six weeks, except that in the cases of physical and biological sciences, and certain

other subjects, two or more of the five periods each week must be double periods. For these exceptions and further information, see the description of units in annual catalog.

Fifteen units, the equivalent of a four years' high school course, are required for entrance to the College of Arts and Science. Three units in English, one unit in mathematics and two units in one foreign language are fixed requirements, with exception that graduates of secondary schools fully accredited by the University of Missouri are admitted without reference to these fixed requirements. The remaining nine units may be selected from the following list, in which is indicated the maximum and minimum number of units accepted in each subject.

Subjects	Maximum	Minimum
English	4	3
Algebra (elementary)	1½	1
Plane Geometry	1	1
Solid Geometry	½	½
Plane Trigonometry	½	½
*Arithmetic (advanced)	½	½
*Algebra (advanced)	½	½
History	4	1
American Government	½	½
Latin	4	2
Greek	3	2
German	3	2
French	3	2
Spanish	3	2
Physics	2	1
Chemistry	2	1
General Biology	1	1
Botany	2	1
Zoology	2	1
Physiology	1	1
Physical Geography	1	½
Agriculture	2	1
Music	1	½
Drawing	2	1

(Continued)

*Must be preceded by Elementary Algebra and Plane Geometry. Advanced Arithmetic and Advanced Algebra cannot be offered together.

Subjects (Continued)	Maxi- mum	Mini- mum
†Manual Training	2	1
†Domestic Science and Art	2	1
†Economics	$\frac{1}{2}$	$\frac{1}{2}$
†Commercial Geography	$\frac{1}{2}$	$\frac{1}{2}$
†Bookkeeping	1	$\frac{1}{2}$
†Stenography and Typewriting	1	1
†Teacher-Training Courses	2	2

For further information, including list of accredited secondary schools, etc., see annual catalog.

2. If a preparatory school is maintained in connection with the college, its work must be approved by the University of Missouri.

3. The course of study in the college must be two years in length; and the college year, thirty-six weeks.

4. For graduation from the college, the student must complete satisfactorily sixty hours of work, which must be the equivalent of that required in the first two years in the College of Arts and Science in the University of Missouri. The specific requirements are as follows:

(a) six hours of English; (b) five hours of History; (c) ten hours of one foreign language; (d) three hours of Mathematics or Logic; (e) five hours of physical science (Chemistry, Physics, Astronomy, Geology and Geography); (f) five hours of biological science (Botany, Zoology).

These requirements may be waived on the following conditions: If the student presents three units for entrance in the requirement (b) or (d), or two units in the requirement (e) or (f), he will be excused from that requirement. If the student presents three units for entrance in one foreign language, he will be excused from five hours of the requirement (c), and if the student is prepared to enter the second course in a foreign language, he may fulfill the requirement by taking, in addition to this second course, five hours of another foreign language. *Such exemptions do not excuse the student from the requirement of a total of sixty hours for graduation.*

†The maximum amount of commercial and industrial subjects accepted is four units.

†No credit is given unless all three teacher-training courses outlined by the State Superintendent of Public Schools are completed.

By an hour is meant a 60-minute period of class work, or a 120-minute period of laboratory work (exclusive of preparatory instruction and study, work upon notebooks that can be done outside of laboratory, etc.), each week for one semester.

5. Students shall not be permitted to carry for credit work amounting to more than sixteen hours a week.

6. There must be a sufficient number of teachers to conduct the work without crowding the classes, or without assigning to individual teachers an excessive amount or variety of work.

7. All college teachers should have had training equivalent to four years' work in a standard college, and it is desirable that they should have completed one year's graduate work.

8. There must be a laboratory for physical science and a laboratory for biological science, each adequately equipped and sufficiently large to permit easily of individual work upon the part of the students.

9. There must be an adequate library equipment.

10. The college must give satisfactory instruction in the work specified in the fourth requirement, and, in addition, must give satisfactory instruction in other courses which the student may take in completing the conditions for graduation.

I

OUTLINES OF APPROVED SUBJECTS

For the sake of convenient uniformity, it is suggested that junior colleges affiliated with the University adopt the numbering and nomenclature of courses as given in this Circular. If a course is offered only in the first semester, the letter *a* may be attached to the initial number, as 1a, 2a. If the course is offered only in the second semester, the letter *b* may be attached, as 1b, 2b. If the course is offered in the first semester and repeated in the second, it may be designated as 1a or 1b, 2a or 2b, etc. The number alone may be used to indicate courses continuous through both semesters, as 1, 2. *The number in parenthesis at the end of the description of each course indicates the number of hours' credit which satisfactory completion of the course should count towards graduation.*

It is not expected that all courses described in this Circular will be offered by any one junior college. It is desirable, however, that those courses which are offered conform to the ones described.

ENGLISH

1. **Composition and Rhetoric.** This course consists of detailed study and practice in construction and in the kinds of composition. The work includes recitations, exercises, themes, conferences, and classroom study of literature illustrative of the different kinds of composition. Such books as the following are suggested as a basis for the course: Ashmun's *The Study and Practice of Writing English*, Woolley's *Handbook of Composition*, Pearson's *Principles of Composition*, Fulton's *College Life*, Palmer's *Self-Cultivation in English*, Palgrave's *Golden Treasury with Additional Poems*, Canby and Pierce's *Selections from Robert Louis Stevenson*.

The main purpose of the course is to train students to write as correctly and effectively as possible. To this end continued drill in spelling, punctuation, grammar, and sentence structure is necessary; and much practice in the development of the paragraph and the whole composition should be given. A carefully prepared theme of about 500 or 600 words each fortnight, an impromptu class theme of one paragraph each fortnight, and, at the end of each semester, a longer theme of about 1200 or 1500 words, involving the use of several sources of information, are suggested as a reasonable amount of writing to be re-

quired. No careless or evidently perfunctory work should receive any credit whatever; and no credit should be given for a theme if a student fails before coming to the conference to make carefully the corrections indicated. The written work, which should be mainly expository in character, should be correlated with the reading in this course and with the knowledge gained by the student in his other courses.

This course should be required of all students except those who enter the college with advanced standing for work done in another standardized college.

Three hours a week for two semesters. (6)

2. **English Literature.** The first half of this course should consist of a careful and thorough class study of selected masterpieces, accompanied with a considerable body of material for outside reading, all arranged according to types. The aim of the course should be as follows: (1) To establish, especially through the class study, habits of careful and intelligent reading; (2) to cultivate and extend a sound appreciation of good literature; (3) to stimulate, especially through the outside work, an active interest in independent reading; (4) to impart a knowledge of the principal types of literature. A typical semester's work might well consist of one of Shakespeare's plays, as representative of the drama, taking about two-thirds of the total class time, and some of Burns' poems, as representative of the lyric. Verity's edition of *King Lear* (Pitt Press series, Putnams, N. Y., agents) would be suitable for the former; and *Selections from Burns*, edited by Dow, (Athenæum Press, Ginn) for the latter. In general, the outside reading should be much more simple than the material read in class. It should be so arranged as to begin, as near as may be, with the student's present interests, and to proceed, by a subtle but progressive adaptation, to selections of richer content and greater literary worth. The great object of the outside reading, or even of the course as a whole, is not so much to impart a formal knowledge of the representative types of literature, as it is to lead the student to read with independent delight the best things in literature.

The second half of this course should consist of a rapid survey of the main periods of English literature. Illustrative readings from the principal authors should be used and the literature which was read in the first semester correlated chronologically. Emphasis should be given to the development of English literature.

Three hours a week for two semesters. (6)

3. **Composition and Literature.** In place of course 1 and 2, a combination course in composition and literature may be given. If this is done, it is important that at least half of the time and energy devoted to the course be given to composition work. Five hours a week for two semesters. (10)

4. **Exposition.** This course consists of practice in writing the various types of essay, with critical study of current exposition. Exercises in logical analysis and organization should be required. The students should receive constructive criticism in regular personal conferences with the teacher. Such books as Smith's *The Mechanism of English Style* and Fulton's *Expository Writing* are suitable as a basis for the course. In the study of current exposition, it is advisable to have the class use such a magazine as the *Atlantic Monthly*, each student subscribing for the magazine for three months. This course is more advanced than English 1. In it the styles of various authors—for example, De Quincey, Carlyle, Macaulay, Stevenson, H. G. Wells, and G. K. Chesterton—should be studied; and, in the light of the information thus gained, the leading articles in the current issues of the *Atlantic Monthly*, for instance, should be read and discussed.

The written work, one theme a week, gives practice in the principles of structure and the qualities of style. The following list of assignments indicates the nature and amount of the written work: (1) Discussion of a local college problem, (2) Criticism of an existing condition with the proposal of a remedy, (3) Interpretation of the significance of a present day tendency in education, literature, the drama, social life, etc., (4) Discussion of some vague term that needs definition, (5) An explanation involving classification, (6) Analysis of a debatable question, (7) An editorial, (8) A familiar, personal essay, (9) Explanation by means of narration, (10) A biographical portrait, (11) Explanation by means of description, (12) Criticism of a magazine essay, (13) Criticism of a short story, (14) Criticism of a modern play, (15) Criticism of a magazine poem.

Three hours a week for one semester. (3)

5. **Narration and Description.** This course consists of practice in writing the story and related forms of imaginative composition. Such books as the following are suitable for texts: J. B. Esenwein's *Writing the Short Story*, Margaret Ashmun's *Modern Short Stories*, B. A. Heydrick's *Types of the Short Story*, C. S. Baldwin's *Specimens of Prose Description*. Among other excellent text-books may be mentioned W. S. Pitkin's *The Art and Business of Story Writing*, which is unexcelled for advanced students; H. S. Canby's *A Study of the Short Story*, which is mainly historical, with a good collection of specimens; and Bliss Perry's *A Study of Prose Fiction*.

This course should be undertaken only by students who have successfully completed the course in general composition and rhetoric. The teacher should be unremitting in checking careless habits that have persisted, and should insist upon a high standard of correctness in all matter of form and grammar, diction, sentence-structure, and paragraphing. On no account should the intellectual side of imaginative

composition be neglected; hard thinking is needed for the mastery of fundamental laws and technique in the "literature of power," with which the course is concerned, as much as in the "literature of knowledge," which is the special province of the course in exposition.

In the content of the course narration should considerably overbalance description; and of the forms of narration the story may most profitably be taken as central. The story, taken in its broadest sense,—not the technical "Short-Story" invented by Poe, which is difficult and should be brought in, if at all, only at the end of the course,—affords abundant opportunity for the study and practise of all the three ingredients of narration,—action, dialogue, comment; of all the four special story elements,—plot, characterization, setting, and spirit or atmosphere; and room beside for every variety of description. An effective course may indeed be arranged in which the story is the only literary form considered; but it is preferable to use this literary form rather as a nucleus, and to illuminate special aspects of its technique by the simultaneous study of forms more confined in their range. Thus the photo-play will give practice in the invention of narration which is nearly pure action; the anecdote illustrates in miniature the elements of plot-structure; the one-act play or dramatic sketch is composed of action plus dialog, with special opportunities for character-drawing without analysis or description; the descriptive sketch exemplifies setting and characterization, and may be used for drill in every sort of description proper; the personal essay consists of pure comment and analysis; and the lyric poem may convey only spirit or atmosphere. The comparative study and practise of several different forms probably gives the maximum benefit in broadening and stimulating the student's range of reading and appreciation.

The course should comprise theory, example, and practice, example, being more important than theory, and practice more important than either. The theory may be obtained from a text-book, supplemented by lectures. From forty to fifty examples of narration and description, including stories, plays, sketches, photo-plays, and specimens of any other forms studied, may well be required as outside reading during the course. The selection of reading should be governed by the text-book used and by the range of the school library. In the matter of practice, an average of one story or its equivalent in other forms should be required each week; and each one should be reviewed, if possible in personal conference, and revised or rewritten as seems advisable. Much of the efficiency of the course depends on frequent conference with the individual student. For this purpose time may well be spared, if necessary, by reducing the number of the class hours required and replacing them by personal conferences. Three hours a week for one semester. (3).

6. **American Literature.** This course should embrace some study of the beginnings, particularly of the material, social, and intellectual conditions which were the basis of literature in the several centers of English life in this country before and during the Revolution. It may well, also, if time and the library facilities of the college permit, consider the types and tendencies of American literature in the present century. But the central and chief interest of the course lies in what may be called the standard authors, from Franklin to Mark Twain. Sometimes these writers stand alone, like Poe or Hawthorne or Whitman or Lanier; sometimes they constitute groups, like the Knickerbocker group, the Transcendentalists, the Cambridge scholars. In either case they should be studied in their origins and shaping circumstances as representatives of certain aspects of American life and against a background of social, intellectual, moral, and political history. Some of them—Poe, Hawthorne, Emerson, Whitman, for example—should be studied intensively for their intrinsic literary value or as presenting some problem in criticism. The course as a whole should give not only a first hand acquaintance with the major works of American literature but also a right perspective of literature in America as an expression of American ideals.

Much time should be given to outside reading and the preparation of papers. The latter, besides abstracts, analyses, and occasional detailed critical commentaries—of distinctive poems, essays, stories—should comprise a study of some critical or historical problem which will give training in the finding and the first hand use and evaluation of critical material. It is especially important that the student be trained to acknowledge and give exact citations for all material used. Three hours a week for two semesters. (6)

7. **Public Speaking.** This course should include training in voice-production, articulation, pronunciation, natural reading, and oral composition. In voice-training care should be taken to secure purity of tone before exercises are given for the development of volume and force. Drill in articulation should be emphasized and should include individual sounds, hard combination of sounds, and difficult words and sentences. For the study of pronunciation a phonetic alphabet, preferably the alphabet of the International Phonetic Association, should be learned and many exercises written out in the phonetic spelling. To develop naturalness in reading the student should begin with simple colloquial selections as near ordinary talk as possible and pass from these to more didactic prose and then to selections of sentiment and to emotional oratory. Oral reports on topics connected with the course should be frequent. These reports should always be outlined and may often be written out for closer criticism than is otherwise possible. Further oral composition may well be based on topics suggested by

the current numbers of *The Literary Digest* or *The Review of Reviews*, copies of which can be placed in the hands of each student at reduced prices even for limited periods. Toward the end of the course the various types of public address may be studied and original addresses from ten to fifteen minutes in length prepared and delivered. These original addresses should be carefully outlined and written out for detailed criticism, though they need not, perhaps should not, be delivered verbatim in class. Some drill book like Cumnock's *Choice Readings* should be used. Wynans' *Public Speaking*, Pearson and Hicks' *Extemporaneous Speaking*, Lee's *Principles of Public Speaking*, Baker's *Forms of Public Address*, and Foster's *Principles of Argumentation* are useful books for reference. Two hours a week for two semesters. (4)

For library equipment, see pages 104-110.

FRENCH

1. **Elementary French.** French grammar with constant practice in writing and speaking French. Easy French prose. Five hours a week for one semester, or three hours a week for two semesters. (5) or (6)

2. **Reading, Syntax and Composition.** This course aims to give a good knowledge of the spoken language. Reading from such authors as Mérimée, Halévy, Augier, Bazin, Pailleron, About. Five hours a week for one semester, or three hours a week for two semesters. (5) or (6)

3. **Advanced French.** Selected masterpieces of French literature, both classical and modern; Corneille, Racine, Molière, Hugo, Sand, Balzac, Daudet, Rostand, etc. Study in very brief outline of the corresponding periods of the literature. Five hours a week for one semester, or three hours a week for two semesters. (5) or (6)

The work should be planned so that the three courses will form a continuous whole, the completion of which will fit the student to read ordinary French fluently without translation, to speak and write it with grammatical correctness and some degree of ease, and to understand it from hearing. To this end the work should be oral as far as possible, and careful, unremitting attention should be paid to the pronunciation. Careful attention should be given to the acquiring of a vocabulary, not so much in the form of isolated, detached words, as of connected words and phrases expressing complete thoughts. It is hardly necessary to add that the essentials of the grammar should be thoroughly mastered. The work should give the student some historical knowledge of the literature, some knowledge of the geography of

the country concerned, and a familiarity with the life, thought, and customs of the people.

For library equipment, see pages 111-113.

SPANISH

1. **Elementary Course.** Grammar, reading, conversational practice. It is recommended that special emphasis be laid on Latin-American subject-matter, that grammar be treated chiefly as a helpful short-cut, that practice in the actual use of grammatical principles receive more time than the discussion of theories. The conversational method should be used as much as possible, but not, especially in the earlier stages, at the expense of exact comprehension. From 150 to 200 pages of easy, modern prose should be read. Dictation should be frequent, and a few poems should be memorized as an aid to pronunciation. From the very start, the text read should be made the basis for oral drill, involving short, rapid questions and answers. Among satisfactory texts may be mentioned the following: *grammars*; Olmsted and Gordon's *Abridged*, Holt; Ingraham-Edgren's, Heath; Fuentes and François', Macmillan; Hills and Ford's, Heath; *readers*; Roessler and Remy's *First Spanish Reader*, American Book Co.; Morrison's *Tres Comedias Modernas*, Holt; *Zaragüeta*, Silver, Burdett and Co.; *for composition and conversational practice*, Méras and Roth's *Pequeño Vocabulario*, Heath; Warshaw's *Spanish-American Composition Book*, Holt. Five hours a week for one semester or three hours a week for two semesters. (5) or (6)

2. **Reading, Conversation, Composition.** A rapid review of the main principles of grammar should be made simultaneously with the writing of composition work. Spanish should, as soon as possible, become the sole language of the class-room. It is recommended that, in the choice of texts, special attention be paid to those dealing with Latin-America. Between 300 and 400 pages of representative modern prose should be read. Accuracy should be insisted on in everything. Some stress should be laid on literary qualities. Occasional proverbs and poems should be committed to memory for the sake of pronunciation. Some composition work should be done every day. Among books that may be recommended are the following: *grammars*; see Course 1: *readers*; Albes' *Viajando Por Sud América*, Holt; Supple's *South American Historical Reader*, Macmillan; Larra's *Partir a Tiempo*, American Book Co.; Alarcón's *El Sombrero de Tres Picos*, Holt; Harrison's *Spanish Commercial Reader*, Ginn; Pitman's *Spanish Commercial Reader*, Sir Isaac Pitman and Sons, New York; *for composition and conversational practice*; Warshaw's *Spanish-American Composition*

Book, Holt; Crawford's *Spanish Composition*, Holt; Nutt's *English-Spanish Conversation Dictionary*, Rittter and Flebbe, Boston; *Boletín de la Unión Panamericana*, Washington, D. C.; *Las Noveñades* (a weekly paper), New York. Five hours a week for one semester or three hours a week for two semesters. (5) or (6)

3. **Advanced Course.** The rapid reading of Spanish and Latin-American works, with special emphasis on the historical and social aspects of Latin-American life. Constant practice in speaking Spanish and in writing Spanish of some difficulty. Collateral reading of English and Spanish books on Latin-America. Sight translation of excerpts from the Latin-American portions of the *Commerce Reports* (issued daily by the Bureau of Foreign and Domestic Commerce, Washington, D. C.) is recommended. Among satisfactory texts may be mentioned: *for class-room reading*; Nelson's *Spanish American Reader*, Heath; Mesonero Romanos' *Selections*, Holt; Quintero, *Doña Clarines*, Heath; Shepherd, *Latin America*, Holt (to be read not too rapidly, along with other reading, and to be reported on in Spanish): *for composition-work*; Ramsey and Lewis, *Spanish Composition*, Holt; Remy, *Spanish Composition*, Heath: *for outside rapid reading*; see the list of Latin-American books in the library-list, pages 114-115. Three hours a week for two semesters. (6)

For library equipment, see pages 114-115.

GERMAN

1. **Beginning German.** This course should include (1) careful drill upon pronunciation, (2) systematic drill upon the elements of grammar, (3) abundant practice in oral and written reproduction of the text, in memorizing colloquial and idiomatic phrases, and in dictation. As outlined above, all reading in this course should be intensive. If the work is conducted in this manner, there will not be time to study more than the reading selections contained in such a book as Prokosch's *German for Beginners*. Five hours a week for one semester, or three hours a week for two semesters. (5) or (6)

2. **Reading, Syntax, and Composition.** The course calls for about 200 pages of moderately difficult reading, chiefly prose, with constant practice in oral and written reproduction of selected portions and with review of grammar. About 100 pages from the writings of such authors as Storm, Hauff, Baumbach, Freytag, or from the contents of a book such as Boezinger's *Erstes Aufsatzbuch* should be treated intensively in class study. About 100 pages should be assigned for study outside the class. Dictation should form an important part of this course. Five hours a week for one semester, or three hours a week for two semesters. (5) or (6)

3. **Advanced Reading.** The reading in class in this course should be of two kinds. The reading of texts of moderate difficulty or of such books as Boezinger's *Zweites Aufsatzbuch* or Boezinger's *Mündliche und schriftliche Übungen* should be continued in order to improve the student's control of oral and written expression. Dictation and free composition based upon this dictation should be stressed. In addition, the student should be introduced to more difficult German prose such as that contained in Evans and Merchaut's *Ein Charakterbild von Deutschland* or in Nichols' *Modern German Prose*. Translation may be used advantageously in connection with this more difficult prose. Outside reading should be continued, and the number of pages assigned for a lesson should be increased. Five hours a week for one semester, or three hours a week for two semesters. (5) or (6)

The first three courses in German should be essentially language courses designed to enable the student not only to read German, but also to use the German language effectively as a means of oral and written expression. German should be taught as a living language; it should as far as practicable be the language of the class room. Speaking, reading, and writing should be equally stressed, but each should be used not as an end in itself, but as a means to learning the language. Above all things, thoroughness rather than quantity should be the aim in each course.

Pronunciation. If German is taught as a living language, speaking, reading, and writing are inseparable. Fundamental to all three is good pronunciation, which is necessary not only for accurate speaking but also for retention of vocabulary and for mastery of grammatical forms. Drill in pronunciation should be emphasized at the beginning of the first course and should be continued thruout the second and third courses as well as thruout the first. Pronunciation should be placed upon a thoroly rational and phonetic basis. This fact does not necessarily imply that the phonetic alphabet should be taught to the student, but it does imply that the teacher himself should be phonetically minded and phonetically trained. Constant reference to such a book as Viëtor's *Deutsches Aussprachewörterbuch* will do much to make incisive and rational the teacher's own grasp upon pronunciation. If the teacher is phonetically trained he will drive home the difference between German sounds and English sounds, and insist that characteristically German sounds, such as *Umlauts*, the *ch* sounds, and *l* and *r* are correctly pronounced.

Speaking. German should be the language of the classroom. Every phase of the class work will then contribute toward the acquisition of ability to speak the language and to understand the spoken idiom.

Grammar should as far as practicable be taught in German. More particularly the reading done in class should afford a basis for intensive discipline in oral composition. The student should be required to give back the entire subject matter in German, either in the form of answers to German questions and repetition from memory, or in the form of free oral composition.

Reading. One aim of the first three courses in German should be to have the student read the German text fluently, naturally, and intelligently, without unnecessarily giving time and energy to translating it. Much reading aloud in class under critical supervision of the teacher should contribute to this end. The student needs a good model to follow in this work. The teacher himself should, therefore, frequently read aloud to the class passages upon which he has carefully practiced beforehand. Such reading, when accompanied by the proper kind of training in speaking, develops the syntactical sense requisite for free written composition.

Collateral Reading. In the second and third courses additional reading should be assigned for study outside the class. It should be somewhat easier than the reading done in the class, and should form the basis for work in oral and written composition.

Writing. The writing, like the speaking, should be based primarily upon the reading. Composition work should include the following: changing the tenses of the verbs in a paragraph, changing from direct to indirect discourse, answering in writing questions based upon the text, reproducing in the student's own words a story read, writing dictated exercises, composing letters, and finally writing entirely free compositions based on topics suggested by the student's reading, which furnishes him the necessary vocabulary and idioms. If this method is used, the student will acquire a better appreciative understanding of the German language and literature than he could acquire by means of mere mechanical translation.

Translation. Translation from English into German and from German into English should be reduced to a minimum. Such training as that suggested in connection with the work in speaking, reading, and writing, when drill in synonyms is added, gives the student a better understanding of the meaning of the text and a more accurate control of the language than he could get from translating. Translation is an art. In class work it should be used intensively by assigning selected passages from time to time for written translation into the best English at the student's command.

Dictation. Writing from dictation requires the student to master the German sentence. Preparation for it involves review; the exercise itself trains the ear and the eye, and focuses attention upon details

of pronunciation and orthography. Dictation should occupy an important place in all three courses.

Grammar. Grammar should as far as practicable be taught inductively in the German language. It should be taught from the point of view of *Sprachlehre* by means of *Sprachübungen*. The first course should attempt to introduce the essential elements of grammar, including drill upon the more difficult parts of grammar, such as the forms of the passive voice, the use of cases with prepositions, with verbs, and with adjectives, the uses of tenses and of modes, word-order, and word-formation. This work should be done thoroughly so far as it goes. If at times it should prove impracticable to cover all the details of grammar suggested, they should be thoroughly drilled in the second course, which is expected to add to the grammar taught in the first. The third course should give also a resumé and synthesis of the grammatical knowledge acquired in the first and second courses.

For library equipment, see pages 115-121.

GREEK

1. **Elementary Greek.** Thoro drill in forms and in the fundamental principles of syntax by daily written and oral exercises. Reading of 20-30 pages of easy Greek. Five hours a week for one semester, or three hours a week for two semesters. (5) or (6)

The purpose of this course should be to have the students learn the forms and the fundamental principles of syntax as rapidly as is consistent with thoroness and accuracy, so that as soon as possible some easy reading may be begun.

2. **Xenophon's Anabasis.** A thoro review of syntax and of Attic forms. Five hours a week for one semester or three hours a week for two semesters. (5) or (6)

In this course a systematic study of the grammar should be made in connection with the text read. This work may be profitably supplemented by weekly translations from English into Greek. In this way the student will acquire a larger vocabulary and will have the grammatical principles more thoroly impressed on the mind.

3a. **Xenophon and Plato.** Two books of Xenophon's *Memorabilia*; Plato's *Apology* and *Crito*. Not merely a translation of the texts, but also a study of Socrates and his philosophy. Three hours a week for one semester. (3)

Effort should be made to have the students acquire an ability to read rapidly. For this purpose frequent practice should be had in translating at sight passages beyond the assignment. The student should read the Greek aloud and endeavor to get the meaning in that

way. In connection with the work in the original the rest of the *Memorabilia* and some other dialogues of Plato might be read privately by the students in translation. They would also read with interest *The Myths of Plato* by Stewart, London, 1905, and a brief history of philosophy such as may be had from Mayor's *A Sketch of Ancient Philosophy from Thales to Cicero*.

4b. **Homer.** Reading of four or five books of the *Odyssey* or the *Iliad*, with special attention to reading metrically. Three hours a week for one semester. (3)

The dialect should be learned at once. This may be done most effectively from the text assigned from day to day by the teacher. Each dialectic form should be explained and the corresponding Attic form given. The students should be encouraged to read in addition to the class work the remainder of the poem in English translation. For this purpose Palmer's *Odyssey* and Lord Derby's translation of the *Iliad* are recommended.

5. **Classical Mythology.** The myths as they are represented in Greek and Latin literature and in art. Recitations and illustrated lectures. Two hours a week for one semester. (2)

The students should be encouraged to read widely in translation Greek and Latin authors whose works contain the classic myths. The lectures should be illustrated as fully as possible by representations of works of art.

Text-books such as the following for the courses above are suggested:

1. Ball's *Elements of Greek*, Macmillan; White's *First Greek Book*, Ginn; Gleason's *Gate to the Anabasis*, Ginn; Moss' *First Greek Reader*, Allyn and Bacon; Colson's *Stories and Legends*, Macmillan.

2. Mather and Hewitt's *Xenophon's Anabasis*, American Book Co.; Goodwin and White's *Xenophon's Anabasis*, Ginn; Smith and Bonner's *Xenophon's Anabasis*, D. Appleton; Goodwin's *Greek Grammar*, Ginn; Hadley-Allen's *Greek Grammar*, American Book Co.; Pearson's *Greek Prose Composition*, American Book Co.

3a. Smith's *Xenophon's Memorabilia*, Ginn; Winans' *Xenophon's Memorabilia*, Allyn and Bacon; Dyer's *Plato's Apology and Crito*, Ginn; Kitchel's *Plato's Apology and Crito*, American Book Co.

4b. Seymour's *Homer's Iliad*, Ginn; Perrin's *Homer's Odyssey*, Ginn; Sterrett's *Homer's Iliad*, American Book Co.

5. Gayley's *Classic Myths*, Ginn; Guerber's *Myths of Greece and Rome*, American Book Co.

For library equipment, see pages 122-124.

LATIN

1. **Cicero's Orations.** Open to students entering with two entrance units in Latin. Selected orations and letters of Cicero; training in syntax and in the forms of the language. Five hours a week for one semester or three hours a week for two semesters. (5) or (6)

2. **Virgil's Aeneid.** Open to students entering with three entrance units in Latin. Study of subject matter, forms, prosody, and syntax. Five hours a week for one semester or three hours a week for two semesters. (5) or (6)

3. **Cicero's Essays on Friendship and Old Age.** Open to students who have taken course 1 or who presented three units in Latin for admission. Careful review of forms and syntax by means of writing in Latin short sentences which involve the vocabulary and the constructions of the Ciceronian text. Five hours a week for one semester or three hours a week for two semesters. (5) or (6)

4. **Livy and Horace.** Open to students who have taken course 3 or the equivalent. The war with Hannibal, Books XXI or XXII, and selections from Horace. The geography of the ancient world. Three hours a week for two semesters. (6)

5. **Elementary Course in Latin Prose Composition.** Open to students presenting three units for admission. The writing of paragraphs; oral work on short sentences. One hour a week for two semesters; or, preferably, 2 or 3 hours a week for one semester. (2) or (3)

For library equipment, see pages 124-132.

MATHEMATICS

1. **Trigonometry and Algebra.** Five hours a week for one semester, or three hours a week for two semesters. (5) or (6)

It is preferable, but not necessary, that at least part of the college algebra precede the trigonometry. Most of the more recent texts in trigonometry and college algebra are acceptable. In view of the limitation in time and the large amount of available material, certain omissions from the ordinary texts are suggested, not because the material is not valuable, but because it may better be postponed to later courses.

College Algebra. The algebra part of this course should begin with a rapid review of elementary algebra. This review should be conducted with reference to the gaining of a thoro knowledge of the fundamentals with simple problems. The fundamental assumptions should be thoroly understood thru the use of concrete illustra-

tions rather than in a formal logical way. The mechanical operations, such as long division, symbols of aggregation, the simpler cases in factoring, and simple and complex fractions, should be thoroly reviewed.

The solution by elementary methods of linear equations in one unknown and pairs of simultaneous equations should be reviewed. The meaning of the graph in representing statistical data should be studied, and the graphical solution of simultaneous equations in two unknowns should be illustrated by a few simple problems, including the case where the lines are parallel. Thruout the course the graph should be used to throw light on the meaning of the equations and of the algebraic processes rather than as a practical method of solution. Determinants of the second and third order should be studied with a suggestion as to the meaning of determinants of higher order. The case where the lines are parallel or coincident, in which the determinant of the coefficients reduces to zero, furnishes a clear illustration of the impossibility of dividing by zero.

The simpler operations with radicals of the second degree should be thoroughly mastered, with special emphasis on negative and fractional exponents. The complete study of exponents, however, is taken up to the best advantage in connection with logarithms, and the topic should be reviewed, at least, when logarithms are taken up.

The solution of quadratic equations by completing the square and by the formula should be reviewed. Graphical solutions and applications to concrete problems should be emphasized. The case where there is only one or no real solution and also the meaning of negative solutions may be illustrated graphically and by concrete problems such as that of a body thrown vertically. Radical equations may be treated but need not be emphasized. They furnish the best illustration of equations which are not satisfied by one of the answers obtained by formal processes.

Simultaneous quadratic equations should be illustrated by a few simple cases treated graphically, but a large amount of graphical solution is not desirable at this stage, as it is not the practical method. The special methods treated so extensively in most text books are not important, as they apply to only a very limited class of problems.

Arithmetic and geometric progressions should be treated. Only the necessary fundamental formulas need be used. Applications should be made to averages, compound interest, and annuities. The infinite series may be omitted.

Permutations, combinations, and probabilities should be studied. Only the simplest fundamental formulas should be used, emphasis being put on securing a clear understanding of the situations.

Mathematical induction may be omitted as a topic, but the method should be used where it is helpful in special proofs.

The binomial theorem for positive integral exponents may be proved by mathematical induction or by the use of combinations. Chief emphasis should be placed on the use of the theorem itself.

Only the simplest formal treatment of complex numbers should be attempted. The square root of minus one should always be replaced by the letter i , and this can be worked with in all respects as any other algebraic quantity. No other principles are necessary. The graphical representation of complex numbers should not be treated at this stage, as students tend to confuse it with the ordinary graphical representation. In all junior college work it is recommended that students be told that complex numbers have important uses in higher mathematics but that they have no useful applications at present. They may be entirely omitted from the course without harm except for purely formal work. If this is done, when the graph of an equation does not show a root, the student may be told that the equation has no real root, and the study of the imaginary roots may be postponed to a later course. De Moivre's theorem should be omitted.

Equations of the third degree and higher may be solved by estimating the root, substituting in the equation, plotting points on the graph, and repeating this process, each time getting a closer approximation. Answers should be accurate to two or three significant figures. Attention should be called to the fact that the computation is wholly arithmetic and that the graph is merely suggestive. No such formal scheme as that called *Horner's process* is desirable at this stage. The usual formal schemes and rules are objectionable in this course as they tend to obscure the real issue. They may be useful to the experienced mathematician in saving time, but are objectionable for the beginner.

Inequalities may be treated briefly. Partial fractions and infinite series should be omitted.

Owing to their great importance logarithms should be treated in connection with algebra and in connection with trigonometry. Close connection should be made with the complete treatment of exponents. Extensive practice should be given in making numerical computations of all sorts, including compound interest, annuities, progressions, etc., by means of logarithms. The student should not be permitted to gain the impression that logarithms are useful only in trigonometry. The slide rule should be treated as a special form of logarithmic table. The college should own at least one good slide rule. If possible each student should own an inexpensive one. A very satisfactory slide rule for the use of students can be made in the department of manual arts with the use of a sheet of ordinary logarithmic paper. A slide rule about four feet long for use in the class is very useful. This can be made with very little expense in the Manual Arts department. The use of tables should be emphasized, such as simple and compound interest

tables and tables of squares and cubes and square roots and cube roots. Interpolation should be thoroly studied with all tables used.

Variation should be studied as another language for proportion. The expression *varies as* is widely used in the sciences and should be made familiar by working a large number of problems. This form of representing proportion may largely displace the traditional form. The idea of variation should not, however, be limited to simple proportion, but should be extended so that the student acquires the general idea of the dependence of one quantity on another. This idea of dependence of one quantity on another, or functionability, should be made prominent throughout the course.

Trigonometry. The connection of this work with geometry should be made through solving right and oblique triangles by constructing them to scale with ruler and protractor, and by measuring the desired parts. This method should be kept up as a check on later work. Reality may be given to problems by requiring students to determine inaccessible distances. It should be noticed that no new ideas are necessary for this work, as it can be done equally well in a geometry class.

Definitions of the trigonometric functions should be given in a form which is equally applicable to all angles, although attention need not at first be called to the functions of angles greater than ninety degrees.

The solution of right triangles should be carried out first by the use of the natural functions. The premature use of logarithms prevents the student from getting clear notions as to the meaning of the trigonometric functions. Use should be made of the Pythagorean theorem and tables of squares. A serious study of tables in general should be made, including the natural functions, logarithms, and tables of squares. Interpolation should be studied thoroughly. It is highly important that the student become accustomed to the use of tables of various forms. If possible they should become accustomed to the use of three place, four place, and five place tables, with occasional use of seven place tables, which should be accessible in the library. Four and five place tables are adequate for most uses.

The question of the degree of accuracy is important. The student should be taught to know when a graphical solution will be adequate, when four place tables are adequate, when five or seven place tables are necessary, and when it is not desirable to carry results to a large number of decimal places. The slide rule should be used when possible. Trigonometry furnishes the one place in mathematics where thorough training in numerical computation can be most effectively given. The greatest possible use of this opportunity should be made. Systematic arrangement of computations, freedom from mistake in numerical work, and reasonable speed should be insisted on. For most

students this will form the most practically useful part of their course. Computation problems should always be checked.

After right triangles have been mastered, angles greater than ninety degrees should be studied. Special angles, the relations between functions of one angle, and the plotting of the graph of the functions should be taken up. Such other applications as projections, and composition and resolution of forces give meaning to the functions of larger angles and should not be slighted. The crucial part of trigonometry is a clear knowledge of the definitions of the functions for all angles, and the relations between the functions of large angles and the functions of acute angles.

In the solution of oblique triangles the chief stress should be placed on the solution by dividing into right triangles. With the use of the Pythagorean theorem and tables of squares, logarithms where convenient, and one very simple algebraic process, all cases of oblique triangles can be solved by means of right triangles practically as easily as by the complete logarithmic method. The student sees the meaning of every step in the process, and with reasonable drill is not likely to forget it. The complete logarithmic processes are theoretically much more intricate and are much more likely to be forgotten. Thoroughness at this point should not be sacrificed in order to gain a larger variety of methods. The sine and cosine laws should be taught in this connection as a more compact method of doing the same thing that is done by dividing into right triangles.

The traditional solution by logarithms, using the law of tangents and the laws for half angles may then be taught, but it should not be allowed to overshadow the method by dividing into right triangles.

The fundamental addition formulas for sines and cosines should be very thoroly mastered. Students should see that they can derive all the other formulas involving two angles from these, and have ample drill in doing this. Care should be taken that this work is intelligent and not mere mechanical juggling. The number of formulas to be memorized should be kept to a minimum, and these should be very thoroly mastered.

Some of the simpler trigonometric equations should be studied, but the more complicated ones should be avoided. Such other topics as radian measure and inverse functions may be treated briefly without complicated exercises.

Such advanced topics as De Moivre's theorem, infinite series, and the accurate computation of the trigonometric functions should be omitted. Spherical trigonometry should, in general, be omitted and the time gained be devoted to making the student proficient in computation and in the mastery of the fundamental principles. Spherical trigonom-

etry is useful only in certain very specialized applications and can best be learned when needed.

2. Analytic Geometry. Plane and solid analytic geometry and introduction to the calculus. Prerequisite, trigonometry and college algebra. Five hours a week for one semester, or three hours a week for two semesters. (5) or (6)

Owing to the fundamental importance of rectangular coordinates, they should be explained as though the students had never had them. Oblique coordinates should be omitted.

Formulas for the distance between two points, the division of a line in a given ratio, and the area of a triangle should be studied; and simple theorems from plane geometry should be proven analytically. Polar coordinates and the relations between polar and rectangular coordinates should be explained, and some of the simple cases of equations in polar coordinates should be plotted by points, but all complicated work in polar coordinates may be omitted.

While analytic geometry is an effective means for the study of geometrical figures, it is much more important for the student to recognize that the geometric figure and the equation are both a means of representing and of studying actual quantities of various sorts, as statistical and experimental data. As a beginning in this the representation and interpretation of the values of related quantities by a graph should be emphasized.

The straight line should be studied exhaustively. In this study the slope should be made the basic idea. This should be interpreted as a rate of change. All the standard forms of the equation of a straight line should be familiar, being studied by the actual manipulation of numerical problems rather than by the application of formulas. The solution of simultaneous linear equations should be connected with the intersection of two lines. Such other relations as the angle between two lines, and the distance of a point from a line should be studied.

The circle, parabola, curves representing polynomial equations, the ellipse and the hyperbola should be taken up separately and studied quite thoroly. The work on polynomial equations should be connected with the solution of higher equations in one unknown. The ideas of tangent to a curve, the slope of a curve, and the derivative of a function should be introduced together at this point. Tangents should be dealt with by the calculus method, or such a modification of it as will lead the student gradually to the point of view of the calculus.

The general definition of a conic should be given. The student should see clearly that an equation of the second degree represents a conic, and that the circle, the parabola, the ellipse and the hyperbola and two lines are special cases. He should be able to draw these curves

directly from the definition, and recognize that they can all be formed as the section of a cone. If the separate special cases have been studied thoroly, the general equation of the second degree need not be studied exhaustively. In particular, the traditional work on the removal of a term in xy is not vital, and should not be emphasized.

Some special curves other than conics, such as the sine curve, the logarithmic curve, the cycloid, and a few others should be included.

Emphasis should be placed on the determination of the equation of curves from a set of data such as would be obtained in a laboratory. Some other forms of coordinate paper, such as logarithmic paper, should be used.

The fundamentals of solid geometry, which are more important than the more advanced parts of plane geometry, should not be omitted, but the treatment may be brief. Corresponding to the slope of a line in plane geometry, the notion of direction cosines is the most important single idea, and should be thoroly mastered. The fundamental forms for the equations of a straight line, a plane, a sphere, and a few isolated examples of quadric surfaces should be understood. The general equation of the second degree need not be studied, tangent planes and lines and the general rotation of the axes may be omitted. Students should be familiar with the meaning of one equation, a pair of equations, equations representing cylinders and projecting planes, and plotting surfaces by contour lines. Thruout this work attention should be called to the analogies between plane and solid geometry.

3. **Differential Calculus.** Prerequisite, analytic geometry. The standard course is five times a week for one semester. A shorter course may be given three hours a week for one semester. (5) or (3) (See remarks under course 4.)

4. **Integral Calculus.** Prerequisite, differential calculus. The standard course is given five times a week for one semester. A shorter course may be given three times a week for one semester. (5) or (3)

The names differential and integral calculus do not accurately describe these courses. The modern tendency is to give some integration in the differential calculus, and to reserve some of the more difficult topics, such as Taylor's theorem, for the second course. Any standard text will indicate about the amount to be covered in the two five hour courses. If the two three hour courses are given, the more difficult topics should be omitted, but some differentiation and some integration should be included.

Besides the application to curves and surfaces, applications to physics, mechanics and other sciences should be emphasized. The fundamental idea that the calculus is a study of rates of change should be kept in the fore ground. Special care should be taken in the selection of a text to avoid a purely formalistic book.

The main consideration in planning the course in calculus is not to allow the work to degenerate into the mere memorizing of formulas of differentiation and of integration. To make the work genuinely significant to the student means serious work on the part of the teacher, but unless this can be done it would be better not to offer the course.

The suggestions given above with regard to the organization and conduct of courses in mathematics are not intended to restrict the freedom or initiative of the teacher. The choice of text and the detailed order of topics are entirely secondary in importance to the spirit in which the work is conducted. Especially in the case of students who are to go into higher courses, the general attitude, breadth of view, and clearness of thought of the student are of first importance. With proper maturity of thought on the part of the student, deficiencies in the details of subject-matter can easily be made up in higher courses.

It is assumed that the teacher will use one of the current standard text-books. When such a book is adopted, the presumption is that the teacher will not depart widely from the order or method of the text except for good reason. In so far as the teacher has a real mastery of the subject, he will, however, feel free to modify the course as given in the text-book. The teacher should not feel under obligation either to take up every topic given in the text-book or to have the student solve every problem under the topics that are taken up.

For library equipment, see pages 133-138.

PHYSICS

1. **Elementary Physics.** This course is intended to cover in an elementary manner the general principles of physics. Special emphasis should be given to mechanics and heat with some work in electricity and magnetism and certain selected topics from the other divisions of physics. Five hours a week for one semester or three hours a week for two semesters. (5) or (6)

2. **General Physics.** This course is intended to supplement course 1 so that the two courses together will form a fairly thoro course in general physics. Trigonometry is required for admission to this course. Five hours a week for one semester or three hours a week for two semesters. (5) or (6)

Course 1 should have two aims, first that the student acquire a working knowledge of the broad fundamental principles of physics, and second, that he learn the *methods* of thinking used in physical science. The teacher should understand that he is teaching not only physics, but also the methods of modern science.

The subject-matter of course 2 may overlap that of course 1 to an amount to be determined by the teacher's judgment. Large numbers of problems should be given in course 2, especially in mechanics and electricity. In mechanics the student should learn the use of the British Engineering, as well as the C. G. S. system of units. It is expected that students who have finished course 2 will be able to enter technical courses in engineering.

If the work of course 1 is given in one semester, it is suggested that there be two laboratory periods of two hours each a week and three recitation periods. In course 2 the amount of laboratory work may be less than that of course 1. In no case should there be more time spent in the laboratory than in the study of the text-book.

For course 1 a book similar in grade to Spinney's *Text-Book in Physics*, Macmillan, should be used. It is possible to use the same text for course 2 if the text is supplemented by outside problems and reading. For example, the student might be required to read S. P. Thompson's *Elementary Lessons in Electricity and Magnetism* (Seventh edition) Macmillan. In course 1 an attempt should not be made to complete any one text. It is much better to spend more time on the fundamentals.

For the laboratory some manual of college grade should be used. For course 1 a manual equal in grade to a *Laboratory Manual of Elementary Physics*, published by the University of Missouri and in course 2 one equal to *Laboratory Instructions, General Physics*, published by the University of Missouri should be used. The student should keep a careful note-book record of the laboratory work performed. He should not, however, be encouraged to spend much time on mere clerical work.

In both courses the subject matter in the text should be illustrated by frequent, well-selected demonstration experiments. Class demonstrations by the teacher are often more helpful to the student than hours spent in the laboratory. A partial list of apparatus for demonstration work is given on pages 69-71.

For laboratory equipment, see pages 69-71.

For library equipment, see pages 138-139.

CHEMISTRY

1. **Elementary Inorganic Chemistry.** This course consists of laboratory work, written exercises, problems, and recitations accompanied by class-room demonstrations. The fundamental laws and theories of the subject are emphasized in connection with a study of typical elements

and compounds. The class-room work follows some standard text-book of college grade. The laboratory work constitutes an important part of the course. The laboratory experiments illustrate the different kinds of chemical changes, properties of typical elements and compounds, and include a study of solutions, ionization, and practice in identification, based upon chemical characteristics previously determined, of substances whose composition is unknown to the student. The definiteness of chemical processes is demonstrated by a number of quantitative laboratory experiments. Five hours a week for one semester or three hours for two semesters. (5) or (6)

2. **Inorganic Chemistry and Qualitative Analysis.** Prerequisite, course 1 or its equivalent. A continuation of course 1 with special reference to the chemistry of the metallic elements. The laboratory work may well consist of systematic qualitative analysis, and should include practice in the analysis of various substances the composition of which is unknown to the student. A study of the more important properties of the principal acids and bases will naturally constitute an important phase of the class-work on the metallic elements. The laboratory work will offer numerous examples of reactions to which the fundamental principles studied in course 1 can be applied, especially the law of mass action, chemical equilibrium, reversible and irreversible reactions, ionic concentration, etc. Five hours a week for one semester or three hours a week for two semesters. (5) or (6)

3. **Elementary Organic Chemistry.** Prerequisites, course 1 or its equivalent. An introductory study of the compounds of carbon designed for students who wish a brief survey of the subject; lectures, recitations, and laboratory work. The laboratory work includes a comparative study of the physical and chemical properties and relations of the more commonly occurring organic substances. This course should precede or accompany courses in home economics dealing with foods and chemistry of the household. Three hours a week for one semester. (3)

For laboratory equipment, see pages 71-73.

For library equipment, see pages 139-140.

BOTANY

1. **General Botany.** A study of the morphology and physiology of plants representing the main groups of the plant kingdom with special emphasis upon the evolution of plants and the principles of heredity. Five times a week for one semester, or three times a week for two semesters. (5) or (6)

The course in botany should emphasize the fundamental principles of physiology and morphology. The work should be divided, on the basis of five times a week, into three laboratory periods and two recitations, and on the basis of three times a week for two semesters, into two laboratory periods and one recitation. The work should cover the general field of botany, but an intensive study of certain subjects should be taken up rather than a general survey of a large number of topics. It is well to begin with the physiology of the seed plants, bringing in as much of structure as is necessary to make clear the functional aspect. For this a knowledge of representative plant cells, as the *Elodea* leaf cell or cell of the trichome of the squash, is necessary. The following topics should be considered: absorption of water and the structure of the root; the conduction of water and the structure of the stem; photosynthesis, transpiration, and the structure of the leaf; foods, digestion, translocation, and storage; respiration and fermentation; growth (including secondary thickening); irritability, or the response of the plant to its environment; nuclear and cell division.

In this part suitable experiments should be carefully planned and the individual student, so far as possible, should be required to carry them out in a satisfactory manner. A careful record of observations should be made. The work requires an adequate supply of living plants. This preliminary work should then be followed by the study of a selected series of forms. Care must be taken not to use so many forms that each cannot be studied adequately. The selection of forms can be varied to suit the particular requirements of the laboratory. The following is a suggestive list: *Pleurococcus*, *Spirogyra*, *Oedogonium*, *Fucus*, bread mold, powdery mildews, wheat rust, mushroom, liverwort, moss, fern, *Equisetum*, *Selaginella*, pine and angiosperms. In connection with the angiosperms, the general appearance, floral structure, and fruits and seeds of several of the larger families should be included, thus serving as an introduction to classification. Representatives of such families as the rose, legume, crowfoot, crucifer, lily, grass, composite, mint, etc., should be included.

In all the work, the laboratory study of the plant should precede text-book study or class discussion. In the laboratory study, careful drawings and notes should be made. So far as possible, living material of the various plants should be available. For certain stages, however, preserved material is necessary. In addition to the regular material required, as much additional illustrative material as possible should be on hand. This material can be greatly increased from year to year. Specimens of various plants such as fungi, ferns, seed plants, etc., can be prepared and displayed in the laboratory.

The laboratory should preferably receive illumination from the north, and the tables should be placed so that each student can secure

satisfactory light. For keeping living plants and for carrying out certain experiments, a room with southern exposure is necessary. One can provide a large glass box adjacent to a window with southern exposure and in this can grow satisfactorily any of the materials required for the course. A good substitute for charts is a balopticon.

The selection of a text-book and laboratory guide should be made by the individual teacher to suit the requirements of the particular course given.

2. **General Bacteriology.** This course should include the fundamental principles of bacteriology. Laboratory work on the microscopical and cultural characteristics of various organisms should include the methods of staining bacteria, the preparation and sterilization of media, the isolation and cultivation of bacteria, the influence of the environment upon the growth of bacteria, the characteristic changes produced by bacteria in the medium upon which they are grown, and the simple laboratory analyses of air, water, milk and the soil. The class work should include a discussion of the morphology and physiology of the bacteria, with special emphasis upon the relation of bacteria to the fermentation of organic substances, the rôle of bacteria in the soil, and the relation of micro-organisms to disease in plants and animals. Such books as the following are suitable for texts: Buchanan's *Household Bacteriology*, Conn's *Bacteria, Yeasts and Molds in the Home*, Conn's *Agricultural Bacteriology*, Frost and McCampbell's *General Bacteriology*, Giltner's *Laboratory Manual of Micro-Biology*, Jordan's *General Bacteriology*, Lipman's *Bacteria in Relation to Country Life*, Marshall's *Micro-Biology*, Reed's *Laboratory Manual of Bacteriology*, and Russel and Hastings' *Dairy Bacteriology*. Three hours a week for one semester. (3)

For laboratory equipment, see pages 73-82.

For library equipment, see pages 140-144.

ZOOLOGY

1. **General Zoology.** The purpose of this course should be to present the fundamental facts of zoological science in such a way that the student will be led to an appreciation of the biological point of view and of the scientific method used. The forms examined should be considered as illustrating general zoological phenomena rather than as special examples of some phylum. It is not necessary that a large number be chosen, but each one should be examined in considerable detail. A plan of study which can be put into operation advantageously in most classes because it does not offer serious difficulties either in

the types selected or in the securing of qualified teachers, is as follows: (1) The frog, with special reference to vertebrate anatomy, physiology, development and cellular structure; (2) the protozoa—amoeba, paramoecium, and euglena—with reference to their unicellular organization, physiology, life-cycles, and the relation of micro-organisms to disease; (3) the hydra, as an example of a simple metazoan and for comparison with the preceding types; (4) a form of intermediate complexity—earthworm, crayfish or fresh-water mussel—for the purpose of illustrating the structure and activities of an animal having a complex organization but being quite different from the familiar vertebrate; (5) one or more insects, with emphasis upon adaptation, ecology, life cycles, animal intelligence, and evolutionary problems; (6) lectures, text and reference readings, accompanied so far as possible by demonstration of laboratory and museum material, upon cytological phenomena, the ontogeny of the higher vertebrates, the theory of evolution, and genetics. For such a course Parker and Parker's *Practical Zoology* may be used or Holmes' *The Biology of the Frog*, together with Hegner's *Introduction to Zoology*.

It is not necessary, however, that the course follow exactly these lines, since there is no common practice in the matter of introductory zoology. If a teacher is familiar with the course outlined in Needham's *General Biology* or in Linville and Kelly's *Text-Book of General Zoology*, it may be well to follow the scheme presented in one or the other of these volumes. In any case, however, adequate laboratory work should be given. This course may be given five times a week for one semester or three times a week for two semesters. (5) or (6)

2. **Advanced Zoology.** The nature of this course should be determined by the training and inclinations of the teacher even more than course 1. Where the course in general zoology follows the outlines detailed above, a good second course may be given with Linville and Kelly's *General Zoology* supplemented by such works as Thomson's *Outlines of Zoology*, Hertwig's *Manual of Zoology* and Hegner's *College Zoology*. Such a course should consist of lectures, laboratory work, and field studies, and should be designed to present a general survey of the animal kingdom with intensive study of representative forms of the principal phyla. The emphasis should be laid upon the protozoa, the mollusca, the arthropoda, and the vertebrata. Each phylum should be studied in respect to its distinctive characteristics, consideration being given to morphological, physiological, ecological, and developmental aspects. Wherever possible, attention should be called to the results obtained from recent experimental studies.

An alternative second course which might be given is one in comparative vertebrate anatomy, including a brief study of the embryology of birds and mammals and giving special emphasis to the conception of

evolution. If a teacher were thoroughly prepared, the second course might be developed along ecological lines, with special emphasis upon birds, insects, and the local fauna. Five times a week for one semester or three times a week for two semesters. (5) or (6)

For laboratory equipment, see pages 83-86.

For library equipment, see pages 144-150.

PHYSIOLOGY

1. **Elementary Physiology.** This course is intended for students who desire a general knowledge of the physiology and personal hygiene of the human body. It is designed to give the student drill in the scientific methods for the study of biological problems, to teach him to observe physiological phenomena, and to develop his ability to make deductions from complicated functional data. Five hours a week for one semester, or three hours a week for two semesters. (5) or (6)

It is recommended that the course in physiology when given for one semester consist of three lectures and two double laboratory periods a week. If the course extends through the year, two lectures and one laboratory period a week should be given. The laboratory work may be based in part on dissections introduced as preliminary preparation for physiological experiments. Also, some well-selected work in histology may be used for preparation work. The strictly physiological experiments are designed always for illustrating principles that hold in the functional behavior of the different mechanisms in the human body. The lower animals such as the frog and turtle retain their vitality very well under laboratory conditions, and should, therefore, serve as the major experimental material. Certain experiments can be formed on the human body, such as the determination of heart rate, pulse, blood pressure, movements of respiration, etc. Even in an elementary course a few experiments on mammals under anesthesia should be demonstrated to the laboratory class as a whole. Detailed laboratory experiments should include the following: muscle irritability, simple and tetanic contractions, nerve irritability, fatigue of muscle, of nerve, influence of temperature on contractility, voluntary muscle fatigue on the human body; the microscopic appearance of the blood, count of blood corpuscles, influence of artificial solutions on blood corpuscles, blood coagulation, the appearance of fibrin, anticoagulants; blood pressure, capillary pressure, capillary circulation, nerve control of small arteries, heart rate, heart sounds, pulse, change in heart rate with body position and with exercise, nervous control of the heart

including the augmentary nerves and inhibitory nerves, change of volume in an organ produced by change of blood supply; respiratory volume, character of expired air, respiratory movements and their nervous regulation, influence of carbon dioxide on respiratory movement; the motility of the alimentary canal including the movements of swallowing, the stomach peristalsis and its nerve control (frog), and peristalsis of the intestine; the secretion of saliva and its nerve control, of gastric juice, of pancreatic juice; the artificial digestion of starches and proteins by the different digestive secretions with chemical tests for end products; tests of the quantity and reaction of the daily output of urine, tests of uric acid, for urea, and for sugars and proteins as pathological constituents; demonstration of reflex action in a reflex frog or a reflex wasp or fly, the decerebrate frog and pigeon; localization of touch, cold and heat stimuli in the skin, tests for the organs of equilibrium, the limits of hearing, a rather complete study of physiology of the eye including tests for the near and far limits of vision, astigmatism, the light reflex, the limits of the visual field, color blindness, color after-images, acuteness of vision for each eye, binocular vision and extra-ocular coordination.

For laboratory equipment, see pages 86-88.

For library equipment, see pages 150-151.

GENERAL PSYCHOLOGY

General Psychology. The purpose of this course should be to set forth clearly and systematically the main facts and principles of normal conscious processes, their nature, modes of operation, and development. It is advisable to adopt the biological point of view thruout the course, and to emphasize the functions of the mind rather than its structure.

This course should include a brief study of the nervous system and of the relation of mental processes to neural activity. Sensation, perception, concepts, memory, imagination, attention, judgment, and reasoning should be treated thoroly and systematically. Reflexes, instincts, habits and the laws of habit formation should be studied in detail. Special attention, also, should be given to feeling, the nature of emotion, volition, interest, effort, and the consciousness of self.

The lecture and recitation should be supplemented with as much experimental work as time and laboratory equipment will permit. Many group experiments may be performed in connection with the regular class work. There are now available several elementary laboratory manuals such as Langfeld and Allport's *An Elementary Laboratory*

Course in Psychology, or Seashore's *Elementary Experiments in Psychology*, the use of which requires very little apparatus.

It will be found helpful to use a good text, such as Angell's *Psychology*, Holt; Pillsbury's *Fundamentals of Psychology*, Macmillan; Titchener's *A Text-Book of Psychology*, Macmillan. Five hours a week for one semester. (5)

For library equipment, see pages 151-153.

SOCIOLOGY

1. **Elementary Sociology.** An introduction to the scientific study of social problems. The first part of the course should consist of a study of fundamental social problems such as the bearing of evolutionary theory and of modern psychology upon social problems, the origin and historical development and present condition of the family, the growth of population, including birth and death rates, the immigration problem, the negro problem, the growth of cities, the social conditions of urban life and of rural life, the social aspects of education, and radical social movements such as socialism. For this first part of the course, a text such as Ellwood's *Sociology and Modern Social Problems*, revised edition, should be used. The second part of the course should specialize upon problems of social welfare, particularly with reference to the dependent, defective, and delinquent classes. For this section of the work a book such as Warner's *American Charities* should be used as a text and a book such as Devine's *Misery and Its Causes* should be used for collateral reading. In junior colleges for women the study of problems of child welfare should be given a large place in this second part of the course. A book such as Mangold's *Problems of Child Welfare* could be used with advantage as a text in this connection.

It is especially recommended that students be encouraged to debate present social problems, as the immigration problem, the negro problem, and the like. Various encyclopedias will furnish material of this nature, especially Bliss' *Encyclopedia of Social Reform*. Five hours a week for one semester or three hours a week for two semesters. (5) or (6)

For library equipment, see pages 153-154.

POLITICAL SCIENCE

1. **American Government.** This course should come in the second year of the junior college curriculum. Students should have a prepara-

tion for this work in a college course in history, the general course in European History satisfying the requirement. In the case of students who come to college with four units of credit in history from an approved high school the requirement of a course in college history may be omitted.

The course in American government should include a comprehensive survey of federal, state, municipal, and rural local government, and should emphasize functions as well as structural aspects of the subject. The study of government ought also to reveal its dynamic character, its constantly changing and evolving form and function. The underlying forces and influences which play upon the various organs of government must be understood. To understand these forces and influences requires a careful study of parties, their influence, methods, and place in our governmental system. Reform movements, such as the short-ballot movement, commission form of city government, and efficiency and economy in administration, should receive due attention. Social and economic tendencies which require governmental action for their realization ought likewise to be given consideration. If these various phases of the subject are properly handled, and the course of current events is constantly drawn upon by the teacher for illustration, the subject can be made of great interest. A book such as Beard's *American Government and Politics* should be used as a text.

The work in American Government should include class discussions and lectures by the teacher upon the basis of the text and supplementary reading. Students should be required to do a considerable amount of reading in addition to reading the text-book. For this purpose the college library should be supplied with a working collection of standard treatises and reference works on American government. Such great classics as Bryce's *American Commonwealth* should become familiar to every member of the class. Frequent short written quizzes are advised as insuring fidelity in this work. There should also be required, if the library facilities are adequate, a written essay upon some special topic which each student is individually assigned, and in the preparation of which he receives individual assistance and guidance by the teacher. Such essays should represent a considerable study of the entire literature of the subject, with special emphasis on the sources, such as statutes, judicial decisions, reports of officials and departments, etc. They should be prepared with care, and should include an outline of the subject as treated in the body of the essay, a full bibliography of all books, articles, and other material used in its preparation, and careful foot-note references.

Five hours a week for one semester or three hours for two semesters. (5) or (6)

For library equipment, see pages 154-158.

PHILOSOPHY

1. **Elementary Logic.** This course should include the principles of both deductive and inductive reasoning. Special attention should be given to the criticism of arguments and the detection of fallacies. Problems should be assigned the class almost daily and their solutions presented not only in oral recitations, but in writing. Such problems will be found appended to nearly all the logic texts. Frequent oral and written reviews are necessary. The student requires constant individual attention and should be trained from the first in precise statement and thoroness in the mastery of the text. Among the serviceable texts are those of Creighton, Jevons, Hibben, and Sellars. Three hours a week for one semester. (3)

2. **Ethics.** In this course, emphasis should be placed upon (1) the chief problems of ethical theory and the relation of these problems to one another; (2) the principal solutions that may logically be offered to these problems; (3) illustrative material selected from the systems of the great historic theorists, such as Aristotle, Plato, the Epicureans, the Stoics, Kant, Mill, and Spencer; (4) ethical theory concretely applied to the typical problems of the individual and to the society of present day civilization. Among the texts servicable in this elementary course are those of Drake, Mackenzie, Wright, Paulsen, Seth, and Thilly. Dewey and Tufts is excellent, but a little more difficult for immature minds. For reference to the history of ethics, Rand's selections in *The Classical Moralists*, as well as Sidgwick's *History of Ethics*, will be found useful. Three times a week for one semester. (3)

For library equipment, see page 158.

HISTORY

1. **European History.** History of Europe during the mediaeval and modern periods, dealt with in as broad and comprehensive a manner as is consistent with thoroness of knowledge and definiteness of outline. Five hours a week for one semester, or three hours a week for two semesters. (5) or (6)

2. **English History.** Political, social, and institutional development of the English people from the earliest times to the present day. Five hours a week for one semester, or three hours a week for two semesters. (5) or (6)

3. **American History.** History of the United States with special emphasis on the period since 1760. Five hours a week for one semester, or three hours a week for two semesters. (5) or (6)

Junior college work in history should be introduced by a general course in European history, which should cover the period from about 400 A. D. to the present time. This course should be followed by more advanced work in American or English history. Because the students should have an adequate knowledge of the history of their own country, American history is preferable to English history for the second course in the junior college. Whatever English history is needed to give the students an understanding of the beginning of American institutions may be studied in European history or as a introductory part of the course in American history.

Each history course should be based upon a text-book of college grade and should include advanced collateral readings. The taking of notes should be encouraged. A loose-leafed note-book with a system of filing similar to a card catalogue is very useful for the organization of material. One sheet should contain notes on only one topic, the name of which should be written at the top of the sheet. In each instance the source of the note should be recorded. Sheets containing material on the same topic should be put together in the note-book. This system admits of indefinite expansion. By organizing material in this manner the student not only records it in a way convenient for later use, but also receives a valuable experience in logical classification.

Intelligent use of maps is of great importance in the study of history. The teacher should give the students definite problems to solve by the use of maps. These problems should begin with the physical characteristics of Europe and include such topics as the Alpine passes, commercial routes, natural and political boundaries, important changes in the unification of states and territorial changes resulting from wars and other causes. In connection with this work, plans of manors, feudal estates, and ethnical and linguistic units should be considered. Frequent use of the blackboard should be made for plans, outlines, and problems.

The preparation of a semester paper by each student is very desirable. For this work the following plan is suggested:

1. The student should find all the books and articles he can that give information with regard to the subject of the paper. These books and articles should be listed on regular 3x5 library cards, one book or article being noted on each card. In the case of each reference the card should contain the name of the author, and the title, place, and date, as follows:

Robinson, James Harvey
An Introduction to the History of Western Europe
New York, 1901
or

Murray, Gilbert
Great Britain's Sea Policy
Atlantic Monthly, CXVIII (1916) 732-45

If an edition of the book other than the first is referred to, this fact should be noted immediately after the title.

2. The student should then read several selections dealing with the subject of his paper.

3. Upon the basis of this reading and any other knowledge he may have with regard to his subject, the student should make a working outline. This outline should consist of a logical arrangement of the principal phases of the topic about which he is to write. For example, a working outline for the subject *The Causes of the French Revolution* might include five sub-heads; namely, the political, social, economic, intellectual, and religious causes.

4. When this preliminary work has been done, the student is ready to take notes and classify them according to his working outline. This method of procedure will enable him to cover the maximum amount of ground and get together the maximum amount of material with the minimum amount of work. The page reference for each note taken from a book or article should be recorded for later use, if needed, in foot-notes in the essay.

5. When the student has taken all the notes he can with regard to each division of his working outline and has properly classified these notes, he should write the paper *from the notes* and not base it directly upon the books from which he has taken the notes. Every important statement in his essay should be supported by reference to the proper authority. *After* each such statement a small figure should be placed slightly above the line, like this¹. The first reference on each page should be numbered 1 and the other references on the same page should be numbered consecutively. These figures should be repeated at the bottom of the page, each followed by the proper reference. When the book or article referred to is mentioned for the *first* time in the references, the information given on the bibliographical card and the page number should be noted; as, for example, "1. Robinson, James Harvey, *An Introduction to the History of Western Europe*, New York, 1911, 25." Other references to the same book may be abbreviated so as to include only the last name of the author and the page; as, for example, "Robinson, 25."

It may be found advisable from time to time to have a part or all of the class review a book such as Marvin's *The Living Past* or some historical novel, which has more general historical content than textbooks. The purpose of this exercise is to train the students to discern

quickly the main theme and to observe whatever may be new or important in the interpretation.

In the more advanced courses in history, the student should be trained to rely less on the text, and more and more on carefully selected and assigned collateral readings and illustrative source materials. He should acquire some ability to judge the relative value and importance of different accounts, and should develop the power to read rapidly and topically, as well as carefully and consecutively. Careful notes should be taken on the class discussions and lectures, and some real facility in note-taking should be secured. The class reports or theses should deal with more comprehensive subjects than those assigned in the general course, and should therefore, require more extended bibliographies and readings. Some simple but real historical problem requiring criticism and constructive thinking should be involved in each report. The more advanced courses should emphasize historical synthesis, the power to put together facts and opinions from various sources into an account with interpretation by the student himself. At the close of this course the students should be ready to enter more special courses where the text-book is dispensed with entirely and where the work consists of reference reading, discussions, and lectures.

If the second course is in American history, intensive study should be made of the period since 1783 or 1789. While political history will necessarily predominate, emphasis should be laid on the underlying economic and social problems, particularly on the influence of the frontier in determining American development and ideals until a very recent period. The essential unity and continuity of American history must not be lost sight of in the rivalry of the North and South.

For the general course in history a book such as Robinson's *Introduction to the History of Western Europe* should be used as a text. A syllabus such as Trenholme's *A syllabus for the History of Western Europe* and colored physical maps such as those by Johnston would be found advantageous for the use of students. The class should have easy access in the reading room to Robinson's *Readings in European History* (abridged edition), Shepherd's *Historical Atlas*, and Robertson and Bartholemew's *An Historical Atlas of Modern Europe from 1789 to 1914*.

For the course in English history a text-book of advanced character such as Cross' *History of England and Greater Britain* should be used. The class should have easy access to a number of well selected reference books of general and special character. Gardiner's *Atlas of English History*, Low and Pulling's *Dictionary of English History*, the *Dictionary of National Biography*, and the latest edition of the *Encyclopedia Britannica* should be constantly used.

For the course in American history a book such as Fish's *Development of American Nationality* should be used as a text. The class

should have easy access in the reading room to MacDonald's *Select Documents...History United States* (3 Vols.), *Epoch Maps* edited by Hart, and Channing, Hart, and Turner's *Guide to American History*.

For library equipment, see pages 158-166.

ART

1. **Introduction to Art.** This course includes a general survey of the fields of design and representation. The principles and theories are presented in lectures, collateral readings, and discussions. Practice work is done with pencil, pen and ink, and wash and water colors. Five hours a week for one semester, or three hours a week for two semesters. (5) or (6)

In view of the fact that college courses in art are not well standardized, a detailed outline of the introductory course in art as conducted in the University of Missouri is given below. While the junior college course need not conform in all particulars to this outline in order to be approved, it should maintain the same standard of work as that represented by the outline. The course in the University of Missouri is given for five periods a week during one semester. Two hours each week are devoted to lectures and discussions, in preparation for which the students are given assignments in reading and drawing. The remaining three periods, each two hours in length, are devoted to laboratory practice. Each section in the outline represents a week's work. For the meanings of technical terms used in the outline, see Dr. Denman W. Ross' *The Theory of Pure Design* and his *On Drawing and Painting*.

The materials used are drawing board and thumb tacks; block of drawing paper; yellow, pale yellow, red, blue, green, and charcoal gray water colors; one small and one large brush for water colors; plate or palette for mixing; cup for water; cloth and sponge; Japanese tracing paper; squared paper; charcoal paper, Michallet being preferable; several sticks of soft, medium, and hard charcoal; kneaded eraser.

The following reference books are used in the course: Reinach's *Apollo*, Prang's *Art Education for High Schools*, Brown's *The Fine Arts*, Ross' *On Drawing and Painting*, Batchelder's *Principles of Design*, Miller's *Essentials of Perspective*, LaFarge's *Considerations on Painting*, and Dow's *Composition*. Each student is required to have a copy of Reinach's *Apollo*, but the other books, which are used only occasionally, are furnished by the institution and placed on a shelf easily accessible to students. The outline of the course is as follows:

General Introduction and a Study of Pictorial Composition with Explanation of Harmony of Tone, Measure, and Shape.—*Discussion*: (1) Brief survey of ground to be covered by the course. List of materials needed. Assignment of first chapter in *Art Education for High Schools* for recitation at the next period and assignment of value scale to be made at home and submitted at the first period of the second week. (The instructor requires assigned home work in drawing to be submitted to him at definite times determined by him.) Assignment of first two chapters in *Apollo* for brief class discussion in second week. (2) Discussion of assigned readings. *Laboratory*: Flat wash; value scale; value contrasts; color wheel. (A good description of the flat wash is given in *Principles of Design*, Chap. III. The value scale and value contrasts and also color are fully explained in *On Drawing and Painting* in the chapter on "Materials and First Exercises," pp. 35-43. These ideas are given in more elementary form by Batchelder and by Prang. *Assignments*: For drawing, value scale painted in charcoal gray. For reading, *Art Education for High Schools*, Chap. I, "Pictorial Composition"; *Apollo*, Chaps. I and II.

Drawing in Terms of Design.—*Discussion*: (1) Demonstration drawing illustrating harmony of tone, measure, and shape, with nature spray or still life as subject. Review of tone. Explanation of dominant and analogous harmonies and of complementary contrasts. (The instructor draws before the class for fifteen or twenty minutes from a nature spray or still life group, using soft charcoal for the purpose of helping the students to visualize simple masses and to render a number of objects by using related terms. In this case the instructor points out, and masses in the harmonies of value before him, calling attention to harmony of shape and measure as well.) (2) Lantern slides showing the influence of the principle of harmony in architectural styles and including six to eight examples each of Egyptian, Greek, Roman, medieval, and modern. (The instructor here shows how useful the principle of harmony has been to great builders of the past in attaining beauty. Good photographs are used in place of lantern slides where the latter are not available.) *Laboratory*: Drawing in charcoal a nature spray or still life. Rendering color harmonies from butterflies or other nature material. *Assignments*: The subject of harmony as given in *On Drawing and Painting* (pp. 60-67), *Principles of Design*; Chaps. III and IV of *Apollo*. Drawing landscape in charcoal and making examples of dominant and analogous harmonies and of complementary contrasts. Examples of harmony of T. M. S. (In the examples of the control of the terms by the principles representative elements are eliminated and the students are confined to spots in pure design.)

Painting in Terms of Design.—*Discussion*: (1) Demonstration painting in water colors illustrating rhythm of tone and measure with

nature spray or still life as subject. Explanation of rhythm from design standpoint. (2) By use of lantern, review of architectural styles with emphasis on influence of rhythm, and display of some examples of the painting and sculpture of each period. *Laboratory*: The painting of nature sprays or still life, selected and arranged to illustrate rhythm of tone and measure. *Assignments*: For drawing, landscape in color and examples of rhythm. For reading, rhythm as discussed by Batchelder, Ross (pp. 67-73), and Prang. The discussion of Phidias and the Parthenon in *Apollo* Chaps. V and VI.

The Principles of Design.—*Discussion*: (1) Explanation of balance of tone, measure, shape and position. (A quiz of 15 or 20 minutes on the two principles already studied is given here. Balance of measure, and of tone and measure combined, are very carefully explained.) (2) Lantern review of architectural styles showing influence of balance and emphasizing views of the Parthenon and its sculpture. (Largely the same views as with the other two lectures. Reference to some of the standard works on Greek art.) *Laboratory*: Designs in line and in notan of two and three tones. (*Composition* is consulted for manner of holding brush, subdivision of space, etc.) *Assignments*: For drawing, examples of balance (B-Pos. B-T. B-M. B-TH). For reading, balance as discussed by Ross (pp. 73-79) Batchelder and Prang, and composition as discussed in *On Drawing and Painting*, pp. 186-88, and *Composition*. Continue *Apollo*, Chap. VI.

The Principles of Representation.—*Discussion*: (1) Beginning perspective. Lines in planes, (a) parallel with and (b) perpendicular to the picture plane. (The student is aided in the study of perspective by being led to think of the plane in which a given line lies and of the relation of this plane to the picture plane. By using photographs of nature, paintings, etc., and by constantly referring to the walls, ceiling, floor and furnishings of the lecture room itself, the instructor aids the student to form the habit of thinking in terms of planes rather than in terms of isolated lines.) (2) Explanation of tone with illustration of color complements, various combinations, etc., by use of lantern and textiles. (Slides of the color wheel are used in the lantern, and also pieces of colored glass in complementary color experiments are used. A recitation in color where the student actually produces in color the relation spoken of, may be given.) *Laboratory*: Designs in color. (The idea here is to enhance the interest of the design made in the previous week by painting it. To decide the best possible treatment, a number of experiments are undertaken, such as a color scheme based on several different values of one color, a scheme of analogous colors, and a scheme of complementary colors, etc. The color treatment may increase the harmony, the rhythm or the balance, or any two or even all three of these, and thus greatly benefit the design. If

time permits, work is begun with spots interesting in their tonal relations, and good measure and shape relations for them are found.)

Assignments: For drawing, view of hallway or long room, with main lines perpendicular to P. P. For reading, *Essentials of Perspective*, Chap. I.

Composition.—Discussion: (1) Composition adapted to purpose; principality and subordination. (2) Written test on elements of design and of perspective. *Laboratory:* Posters with a view to purpose, elements of lettering, spacing, completion. (If necessary, the seventh week is devoted to this work, or portfolios may be substituted for posters in this and the following week.) *Assignments:* For drawing, interior showing window in angular perspective with effects of light. For reading, the subject of perspective in *Art Education for High Schools* and the subject of Romanesque and Gothic architecture in *Apollo*, Chap. XII.

Perspective.—Discussion: (1) Perspective with reference to lines in planes neither parallel nor perpendicular to P. P. and with reference to vertical planes. (2) Lantern illustrations of perspective including examples of Romanesque and Gothic architecture. (It is very easy to combine two interests here and, while looking at examples of Romanesque and Gothic Architecture, after they have been examined as works of art, to discover the directions taken by lines lying in vertical planes that are neither parallel nor perpendicular to the P. P.) *Laboratory:* Portfolios. (Posters may be continued as an alternative or portfolios may be substituted for posters as noted above.) *Assignments:* For drawing, stairway. For reading, *Essentials of Perspective*, Chap. II.

Angular Perspective.—Discussion: (1) Perspective with reference to lines in planes neither perpendicular nor parallel to P. P. and to planes other than vertical, with emphasis on horizontal oblique (up and down hill). (2) Review and quiz. *Laboratory:* Application of perspective principles, including the drawing of large pieces of furniture, parts of the art rooms, etc. *Assignments:* For drawing, light and shade composition depicting a vista of adjoining rooms. For reading, general review of all previous assignments in design and perspective, composition, etc.

(Between the eighth and ninth weeks a mid-semester test is given.)

Drawing by Elimination of Light.—Discussion: (1) Demonstration of drawing in charcoal by the "elimination of light" method as a basis of value study. (2) Lantern talk on composition of masses of light and shadow. *Laboratory:* Value studies in charcoal from still life. (This is carried out in accordance with "elimination of light" method.) *Assignments:* For drawing, painting the scale of yellow.

For reading, the subject of personality in LaFarge's *Consideration on Painting*, Chap. II.

Personality in Art.—*Discussion*: (1) Personality and imitation, with special reference to *Considerations on Painting*, Chap. II. (2) Lantern views of the human figure in art. *Laboratory*: Value studies of more varied groups of still life. *Assignments*: For reading, figure drawing in *Art Education for High Schools*; the Renaissance and modern architecture in *Apollo*, Chap. XIV.

The Interrelation of the Arts.—*Discussion*: (1) Demonstration of figure sketching. (2) Lantern views of Venice, Florence, or Paris, illustrating the interrelation of the arts. *Laboratory*: Figure sketching in pencil or charcoal. *Assignments*: For drawing, sketches for students' own composition on subject of Christmas, nativity or modern. For reading, Brown's *The Fine Arts*, Pt. II, Chap. I, dealing with elements of effects in arts of form.

The Subject in Art.—*Discussion*: (1) Lantern pictures of the Nativity as examples of the subject affecting the expression. (2) Chapter on elements of effects in the arts of form in *The Fine Arts*. *Laboratory*: Still life (values as preparatory to water color or chosen medium) composition on the subject of Christmas. *Assignments*: For drawing, scale of red. For reading, significance and beauty in *The Fine Arts*, Pt. II, Chaps. II and III.

Significance and Beauty.—*Discussion*: (1) Recitation on significance and beauty in work of art. (2) Demonstration of water color painting in still life or landscape. *Laboratory*: During this and the following three weeks students are allowed to elect the medium and general character of their laboratory work in order to gain more experience along some one line. Premedic, or other scientific students, elect pen and ink work from suitable specimens; those interested mainly in the art side choose water color or charcoal. *Assignments*: For drawing, drawing at home in elected medium. For reading, the Renaissance at Siena and Florence in *Apollo*, Chap. XV.

Pictorial Ideas.—*Discussion*: (1) Lantern views showing the development of landscape painting. (2) Pictorial ideas and ideals as assigned in preceding week. *Laboratory*: Elective. *Assignments*: For drawing, scale of blue; home drawing in elected medium. For reading, Venetian painting in *Apollo*, Chap. XVI.

The Scope of Representation.—*Discussion*: (1) Lantern views of scope of representation, illustrated largely from works referred to in *Apollo*, Chaps. XV, XVI. (This is intended to summarize the power of representation as a part of art, the scope of ideas possible of plastic and graphic treatment, and the various materials as means of such artistic expression.) (2) The character of the Renaissance as given in *Apollo*,

Chaps. XV to XVIII. *Laboratory*: Elective. *Assignments*: For drawing, elective. For reading, *Apollo*, Chaps. XVII, XVIII.

The Scope of Design.—*Discussion*: (1) Lantern views illustrative of the Renaissance. (2) Lantern views showing general field of design. (This is intended to summarize the whole field of design in the same way the first lecture of the preceding week did for representation which is a part of the field. The trend of the whole semester toward an appreciation of the social value of art is here strengthened.) *Laboratory*: Elective. *Assignments*: For reading, review.

(A final examination is given.)

2. **Construction.** This course consists of a study of structure in the work of art. The past and present usages in the artistic construction of the human figure are considered. The work is conducted by means of lectures, discussions, readings, and drawing and modeling from casts, draped models, and memory. The introductory course in art described above is a prerequisite for this course. Five hours a week for one semester, or three hours a week for two semesters. (5) or (6)

As in the case of Course 1, an outline of the course in construction given in the University of Missouri is presented here in order to indicate more definitely what the character of the work should be. This course in the University of Missouri is given five periods a week for one semester. One hour each week is devoted to lectures and discussions. The remaining four periods, each two hours in length, are devoted to laboratory practice.

Hildebrand's *Problem of Form*, translated by Meyer and Ogden, is used as a text. The materials used are charcoal, Michallet charcoal paper, pencil sketch pad, French charcoal, soft drawing pencil, kneaded eraser, bottle of fixative and blower, thumb tacks, drawing board, and apron for use in clay modeling.

This course can be conducted without modeling, but a valuable aid to a better knowledge of form is lost if this is done. The institution can furnish the clay with slight expense, since the same clay can be used repeatedly. If the problems indicated in the outline are found to be too numerous, the less important ones are omitted. When two like problems are set, as in the case of studies of opposed types of head, one is a rapid free development and the other a closely controlled study. A sketch club is maintained in order to give students opportunity for a free form of work with personal choice of medium, etc.

The outline of the course is as follows:

Artistic Structure.—*Discussion*: Explanation of artistic structure, artistic vision, artistic movement. Ideas of two dimensional and three dimensional form. Text-book, Chap. I. *Laboratory*: Drawing of low relief and high relief.

Artistic Vision.—*Discussion:* Explanation of properties of form and appearance. Actual and perceptual form. Text-book, Chap. II. *Laboratory:* Drawing of block hand. Drawing of block foot.

Actual and Perceptual Form.—*Discussion:* Experiments with the many possible views of one form. *Laboratory:* Drawing from memory of block hand and foot. Relief modeling in clay.

Form in Space.—*Discussion:* Ideas of form in space. Space expression. Text-book, Chap. III. *Laboratory:* Modeling of block hand or foot. Drawing of true hand, both from model and from memory.

Depth.—*Discussion:* Space considered as penetration into distance. Arrangement of form in suitable planes to suggest depth. Text-book, Chap. IV. *Laboratory:* Drawing of true foot, both from model and from memory. Drawing of two views of skull, with study of actual form as well as of the perceptual form.

Distance at the Periphery.—*Discussion:* Relation of small and large forms. Relation of near and far forms through arrangement of planes. Ideas of distance at edge or center of picture. *Laboratory:* Memory drawing of skull. Drawing of skeleton, featuring articulations.

Artistic Structure in Painting and Sculpture.—*Discussion:* Examination of artistic structure in the painting of different periods and in the sculpture of different periods. *Laboratory:* Drawing of block head from model; drawing of block head from memory. Drawing of flayed head, with actual form of muscular areas.

Form as a Relief.—*Discussion:* Idea of form seen as a relief. Relief conception in painting and sculpture. Text-book, Chap. V. *Laboratory:* Drawing of true head, from model, and drawing of true head from memory. Drawing of true head of opposite type.

Low Relief.—*Discussion:* Examination of various low reliefs to determine necessary number of high points; necessity of relation of front and back plane; layer of uniform depth. *Laboratory:* Modeling in low relief from head in the round.

Relief Conception in the Round.—*Discussion:* Consideration of relief conception in sculpture in the round both in the open and in the indoors. *Laboratory:* Drawing of an original composition treated as low relief. Developing of this composition and modeling in low relief in clay.

Form as Expression of Life.—*Discussion:* Ideas of form as expressing life, movement, etc. Text-book, Chap. VI. *Laboratory:* Drawing of arm. Drawing of leg.

Spatial Values.—*Discussion:* Ideas of form as expressing life continued. The spatial value preceding the functional value. Composition embodying these qualities. *Laboratory:* Drawing of torso.

Functional and Spatial Values.—*Discussion*: Composition as forceful controlled expression of form. Functional and spatial values. *Laboratory*: Memory drawing of torso. Review of skull and flayed head.

The Interpretation of Life.—*Discussion*: Form as interpretation of life reviewed. *Laboratory*: Drawing of living head. In the early part of this last three weeks the head and its integral form are considered as embodied in two planes.

Sculpture in Stone.—*Discussion*: Sculpture in stone. Text-book, Chap. VII. *Laboratory*: Modeling living head.

Review.—*Discussion*: Review. *Laboratory*: Drawing of living head. The same pose is used for a week or more in order that all the principles governing form in this last drawing may be embodied.

(Examination.)

3. **History of French Painting.** This course consists of a critical study of representative pictures by means of lantern slides, photographs, and other reproductions. The course includes lectures, collateral readings, and discussions. While it is desirable that the students, so far as the course is concerned, know much of the history, literature, civilization, and life of France from mediaeval times to the beginning of the twentieth century, this knowledge should be made secondary to that of French painting during this period. A study of the original paintings and of the best reproductions of these paintings is necessary for satisfactory results. The work of the students should consist very largely of the study, analysis, and comparison of pictures. Such study and comparison is the best possible laboratory work. When Claude's name is mentioned, there should be suggested to the student not a series of names and dates in the life of the artist, but the pictures painted by Claude, their quality, peculiarities, and style. A comparison of Claude with Millet should mean a comparison of the paintings of both artists, or of reproductions of these paintings. Two hours a week for one semester. (2)

4. **History of English Painting.** This course corresponds to course 3, except that English instead of French painting is studied. For explanation of the method that should be used, see description of course 3. Two hours a week for one semester. (2)

For laboratory equipment, see pages 88-89.

For library equipment, see pages 166-168.

MUSIC

1. **Appreciation.** This course is planned primarily for students who have no technical knowledge of music. The essential elements in

music are dwelt upon, the styles of masters compared, and monumental works analyzed with reference to their marked points of beauty and their influence upon the progress of the art. Incidentally the historical development of music is treated. Groups of masterpieces are played and analyzed with reference to their beauties and significance. The selections are repeated from time to time so that a familiarity thus obtained may serve the student as a basis for future musical judgment. Technical terms are avoided as much as possible, particular stress being laid on the general elements underlying all the arts. Furthermore, music is here treated not as a thing apart, but chiefly as a manifestation of the universal art principle which differentiates only as it is revealed in word, pigment, marble, or tone. In courses in history of music given in institutions having curricula in music, the work may be somewhat more technical in character, provided that its essentially cultural purpose, which admits of its being considered an equivalent of the course in appreciation, is emphasized. Two hours a week for two semesters. (4)

2. **Harmony.** This course should begin with a thoro study of intervals in order to give the students a knowledge of the melodic and harmonic relationships of tones. The students should then acquire a working knowledge of triads and chords of the seventh and their inversions, preparation and resolution of dissonances in general, modulation, suspension, passing and changing notes, and organ-point. Special attention should be given to those fundamental principles upon which the science of harmony rests. The work in this course should be strictly scientific. It should be based upon the fundamental laws of chord relationship to which the practices of the great composers conform.

Students should work out in written form text-book problems, leaving an extra staff for corrections. These problems should be worked out again with the class by the instructor, and all possible ways in which the problems might be solved should be shown. When the best way is finally selected, it should be written in the vacant staff above the student's offering for comparison with what he has done. Unusual cases should be thoroly discussed and the mooted chords played again and again in their contrasting values, a final decision resting on a criterion of good taste. Figured bases are used thruout the course.

Three hours a week for two semesters. (6)

3. **Counterpoint.** This course includes the addition of parts to a *cantus firmus*. Both simple and double counterpart are studied. Since counterpoint is the art of writing melodies to a *cantus firmus*, it is a great awakening factor for any latent melodic gift which a student may possess, and may, in exceptional cases, pave the way to free composition. As there can be no substitute for inspiration, all that students may hope to acquire by conscientious study is a *reading knowledge*

which really amounts to a full appreciation of counterpoint in its most artistic manifestations in the works of the great composers. Throughout the course that freedom of usage often termed *composer's counterpoint* should be uppermost in the instructor's mind rather than the so-called *book counterpoint*, which is based on the strict regulations of the early experimenters whose procedures are now for the most part obsolete. In this connection, a thorough study of the practices of Bach, as revealed in his well-tempered *Clavichord*, is essential. Three hours a week for one semester. (3)

Credit is not given by the University for junior college courses in music other than those described above.

For library equipment, see pages 168-169.

HOME ECONOMICS

1. **Selection and Preparation of Food.** This is an elementary food course planned to give the student a knowledge of the principles underlying the selection and preparation of food. It should be preceded or accompanied by a course in inorganic chemistry. The study of food should be introduced by some general lessons on digestion. In the study of various foods, emphasis should be given to the economic value and digestibility of each, and to the effect of preparation upon its digestibility. Five hours a week for one semester, or three hours a week for two semesters. (5) or (6)

The course should include a study of the following topics:

(1) Definition and classification of foods: comparison of foods of plants and animals; foods as a source of energy; food as building material; classification of foods on basis of composition and function. (2) Standards of judging foods: chemical; physical; physiological; economic. (3) Sugars and candy making: kinds of sugar; candy making, including a study of the chemistry of sugar; sirups, including a study of the composition and use of sirups in the home. (4) Fruits: composition; methods of preparation; use in the diet. (5) Mineral matter: kind and amount needed; study of distribution in food. (6) Starch and starch cooking: source and structure of starch; effect of heat upon starch; starch puddings, cream sauce and cream soups, including starch proportions. (7) Vegetables: composition and place in diet; cooking to retain mineral matter and soluble constituents; volatile character of much of the flavor. (8) Cereals and cereal products: composition of grains; changes in manufacture of cereals and cereal products; preparation of cereals; cooking cereal products. (9) Classification and general review of carbohydrates. (10) Eggs:

composition; cooking; comparative digestibility of those cooked in different ways; air incorporated in egg as leavening agent, omelette, soufflé, spongecakes. (11) Milk: composition; scum formation; action of acid on milk, as in cream tomato soup; pasteurization and sterilization. (12) Cheese: kinds and composition; methods of preparation; effect of preparation on digestibility. (13) Ice creams and ices: freezing, including function of ice and salt; use of filler; use of binder; kinds and composition of various ice creams. (14) Salad dressing and salads: classification of salad dressings; preparation of salads and salad dressing, including fat in suspension, and in temporary and permanent emulsion; combinations of salads; place in the diet. (15) Fats: composition; use as food; use in cooking. (16) Meats: composition; principles of preparation, tender cuts, tough cuts, very tough cuts; use of left-over meats; effect of preparation on digestibility. (17) Poultry. (18) Fish. (19) Legumes and nuts: composition and value as source of protein; methods of preparation; comparative digestibility. (20) Classification and general discussion of protein. (21) Batters and doughs: general proportion of flour to liquid; kinds of flours, including changes in proportions with different flours; rising agents, their classification and chemistry; special study of cakes and cookies. (22) Preservation of food. (This topic should be inserted at most seasonable time.)

2. Selection and Construction of Clothing. The aim of this course is to prepare the student to deal with her own clothing problems. A high school course in sewing is a prerequisite to this course. The selection of materials and the principles of construction should be worked out through the planning and making of underwear and a simple dress. Only a very small amount of time should be given to practice work.

Two hours a week for two semesters. (4) (No credit is given in the College of Arts and Science for this course.)

The course should include a study of the following topics:

Work Apron.—(1) Purpose: to protect clothing. (2) Qualities to be considered: ease with which it may be worn; neatness; hygiene; laundering quality; ease of construction. (3) Selection of cotton material: methods of examining cotton and judging the finished fabric with regard to durability, adulteration, width, weave, color, and shrinkage; laundering quality of the fabric; cost in relation to quality. (4) Selection of design: ease of construction; care; hygiene; protective quality. (5) Construction of garment: drafting pattern (from kimono night gown); cutting, especially with reference to economical use of material; basting; seam finish; button and button hole; hems; method of putting on bias facing. (6) Criticism of finished product after having used it; comparison as to cost and durability of ready-

made and home-made product; disadvantage of variety in design; choice of best design.

Position while Sewing.—(1) Effect of light on the eyes. (2) Effect of bad posture on health. (3) Type of chair most satisfactory for sewing.

Use of Sewing Machine.—(1) History and development. (2) Manipulation. (3) Care. (4) Study of economic value of different makes of machines.

Making of Hand Towel and Holder.—(1) Selection of material: study of linen with reference to absorption and adulteration; choice of material for toweling. (2) Construction: hemming by hand and machine, use of hemmers, study of difference in time and durability of each; method of sewing on hanger. (3) Holder, including case with pad: selection of material for pad, including study of cloth as conductor of heat, and inflammability; construction, including binding with tape; use of binder; sewing on snaps.

Sleeping Garment Problem.—(1) Ideal sleeping conditions: warmth with reference to equal temperature for whole body; relation of sleeping garment to this. (2) Winter night garment: requirements; selection of design with reference to laundering, comfort, and protection of feet; pajamas *versus* night gowns; selection of material, including study of outing flannel, flannelette, and Canton flannel. (3) Summer night gown: selection of design; selection of material, including study of width, durability, weave and laundering quality of muslin, nainsook, longcloth, crepes, and pajama cloth; study of comparative costs. (4) Problems of construction: drafting of pajamas (adapted from waist and straight drawers); drafting of nightgown with sleeves (adapted from waist and kimono nightgown); making of summer garment of muslin; making of winter garment of flannelette. (5) Special problems: plackets; putting on band; sewing in sleeves; whipping. (6) Criticism of finished garment after wearing: check with ready-made garment as to cost and value of final product.

Underwear Problem.—(1) Use of underwear and needs of body: adequate protection without restriction. (2) Necessary garments: combination suit; underwaist; petticoat; sanitary belt and apron. (3) Combination suit: requirements; study of knit and ready-made garments; selection of design with regard to purpose, hygiene, ease of care, and comfort; selection of material, including study of materials used for combination suits, of how to select materials suitable, and of disadvantages of having large variety of materials of practically the same quality; problems of construction, including drafting of pattern; study of finishing, including lace and its economic value, embroidery and its economic value, braids and sticker finishes, bias tape (collect samples of different widths and quality; mount with number and price

attached), woven tape of linen and cotton (collect and mount samples of each with width and price). (4) Underwaist: function: selection of design; disadvantage of corset; stocking supporters; planning of waist to take place of corset; selection of material; firmness necessary to support clothing; study of galatea, drilling, muslin, cable net; problems of construction; draft; study of fastenings with reference to hooks and eyes (different kinds, value of each, method of sewing on), snaps (kinds, method of sewing on), buttons (kinds, methods of sewing on); use of tape; method of attaching supporters; study of elastic and of supporters on the market. (5) Petticoat: discussion of bloomers constructed to take place of petticoat; requirements of petticoat with reference to summer and winter, opaque, easily laundered, easily constructed; suspended from underwaist; discussion of princess slip; advantages and disadvantages; selection of design with reference to four gore, double panel front and back, five gore, double panel front, three gore, and disadvantages of ruffles; selection of material with reference to opaqueness, study of pique, poplin, muslin, galatea, sateen, study of silk petticoats, jersey, crepe de chine, taffeta, dark-colored petticoats of sateen, percaline, etc., and use of bloomers made of material of skirt or dark colored material to match; special problems, including buttonholes, bound for band of skirt, and stitched scallops for finish at bottom. (6) Making of sanitary belt and apron. (7) Criticism of undergarments after finishing and trying out; study of types of ready-made underwear on the market; wool as used for underclothing; selection of a few designs that suit needs of all.

Care of Clothing.—(1) Laundering. (2) Mending: darning; patching. (3) Value of proper care of clothing.

Dress Problem.—(1) Functions of outside garment. (2) Fashion and economic waste. (3) Simplification of dress to give hygienic, economic, and artistic dress for women. (4) Selection of material for wash school dress: cotton, including study of white goods, and colored material and amount of its fading; linen, including study of materials on market and estimate of their value, and comparison of cotton and linen from points of view of practical use and cost. (5) Selection of design, with reference to hygiene, economy, modesty, art, simplicity of construction. (6) Use of commercial pattern: altering of pattern to suit measurements; value of commercial patterns. (7) Criticism of finished garment.

Clothing Accounts.—Keeping of clothing accounts during whole year, itemized so as to be of use in working out clothing budget; working over accounts into budget for following year.

The student should make a large collection of samples of the materials which she studies and catalogues. Liberal use should be made of shops both in the study of ready-made clothing and of materials.

3. **Household Problems.** This course should give the student a general insight into the field of home economics through a study of the modern home. Two hours a week for one semester. (2)

The course should include a study of the following topics:

(1) Function of the home. (2) Woman and her relation to the home from the points of view of the following: Gilman's *The Home*, chapters XV, XVI, and VII; Key's *The Renaissance of Motherhood*, chapter III; Tarbel's *The Business of Being a Woman*, chapters III, IV, and IX; Martin's *The Unrest of Women*, chapters I, V, and VII; Katherine S. Anthony's *Feminism in Scandinavia and Germany*, chapter I; Martin's *Women in Industry, or the New Humanism* (five articles in the *Survey*, March and April, 1916); answers to these articles by several feminists in *Survey*, April 15, 1916. (3) The home as the center of consumption: responsibility of women as consumers. (4) Devices used by producers to control consumers: trade marks; advertising; fashion; special inducements such as trading stamps, premiums, and bargain sales. (5) Control of consumer over producers: by voluntary association through cooperative buying, consumers' league, housewives' league, trade union label; by legislative control in the interest of the consumer and in the interest of the worker; by public provision of market facilities; by utilization of parcel post. (6) Standards of living; meaning and value of a standard of living; relation of standard of living to the division of the income; reasons for increased cost of living. (7) Analysis of the standards along the following lines, including study of present standards and formulation of rational standards: food; shelter; clothing and its relation to fashion. (8) Household management: application of efficiency methods to the home; planning of equipment, including labor saving devices; scheduling and despatching. (9) Domestic service: present situation; suggested solutions. (10) Children in the home: cost; training; rights. (11) Relation of the home to the community.

4. **Food Problems of the Household.** The aim of this course is to prepare the student to deal with the food problem as it presents itself in the average home. The course includes the study of the principle of the balanced diet, the nutritive value and cost of the various food materials, the purchase and care of food in the home, and the equipment needed for preparing and serving food. Throughout the course meals to meet definite conditions are planned, prepared, and served. The courses entitled *Selection and Preparation of Foods* and *Household Problems* are prerequisites for this course. Two hours for one semester. (2)

The course should include the following topics:

Food Value.—(1) Food for energy: energy requirement according to age, weight, and activity; fuel value of the various food materials,

with weight, measure, and cost of 100 calorie portions. The laboratory work should include calculation by students of their own energy requirements; planning, preparing, and serving several breakfasts at different costs per hundred calories, each breakfast meeting one-fourth of the daily energy requirement of the group preparing it. (2) Protein: protein standards according to age, weight, kind of protein, and proportion of energy from fat and carbohydrates; protein value of the various food materials with weight of protein in 100 calorie portions. The laboratory work should include calculation by students of their own protein requirement; planning, preparing, and serving several luncheons, using the same costs per 100 calories as in the case of breakfasts, each luncheon meeting one third of the daily energy and protein requirement of the group. (3) Mineral matter: function, requirement and occurrence in foods of iron, calcium and phosphorus; balance of acids and bases. (4) Vitamines: summary of means of securing in diet. The laboratory work should include planning, preparing, and serving several dinners, using again the same costs per 100 calories, each dinner meeting five-twelfths of the daily energy and protein requirement of the group. The mineral matter and vitamines in the menu should receive special emphasis.

Adaptation of Food to the Individual.—Digestibility; palatability; bulk; guidance of appetite; quality; arrangement of meals. The laboratory work should include planning, preparing, and serving of breakfast, lunch, and dinner for one day for a family of two adults, with definite energy and protein requirement and at a definite cost per 100 calories.

Adaptation of Food to the Income.—(1) Food budgets: per cent of different incomes spent for food; cost of food per man per day on different incomes. (2) Laboratory work should include planning of daily menus for a family of two adults at a minimum, a moderate, and a liberal cost per man per day. (3) Factors influencing cost of food: cost of production and of transportation; keeping qualities; demand; quality; flavor; forms; cost of preparation; amount of waste. The laboratory work should include collection from local stores, catalogs, etc.; examples of the influence of these factors on the cost of food.

Feeding of Children.—Change from milk diet; differences from adult's diet; diet at different ages. The laboratory work should include planning, preparing and serving of one day's meals for a child at several different ages.

Methods of Planning Meals.—Use of food records; system in planning. In the laboratory work, each student should start planning menus for a family for one week in spring, summer, fall, and winter, showing definitely the number, age, and occupation of the members of

the family, the locality in which they live, and the size of their incomes.

Purchase of Food.—Cost of distribution, wholesale and retail; improvements in methods of marketing and in markets; system in purchasing. In the laboratory work each student should make out a wholesale order for several months for the family for which menus are being planned, with the brand, amount, and cost of each item, and a retail order for one of the weeks planned for. (Wholesale grocery catalogs may be used.)

Care of Food in the Home.—Receiving food, storing it, and preserving it in ice box.

Food Laws—Adulteration, sanitation of factories and shops; weights and measures, conditions of labor. In the laboratory work, the student should visit and score local markets.

Home-Made versus Commercially-Made Products.

Home Kitchen versus Cooperative Kitchen.

Recitations and laboratory work should be very closely connected by the planning, preparing, and serving of meals throughout the course. Cost should be emphasized throughout, and meals which fulfill the same requirements should be prepared at different costs. The day should be considered as a whole, and the three meals should meet each set of conditions prepared either at successive or at the same periods.

The nutritive value and cost of recipes and meals should be calculated from the table of 100 calorie portions, and put in permanent and convenient form. For this permanent form a card catalogue is better than a notebook. It is convenient to use 4x6 inch cards, punched at the top so they can be hung up, and printed with headings for material, measure, weight in ounces and grams, protein in grams, calories and cost. (These may be purchased from the University Cooperative Store, Columbia, Missouri.) Plain 4x6 cards may be used for daily menus and order lists, and all may be filed in a pasteboard or wooden card box.

For laboratory equipment, see pages 89-93.

For library equipment, see pages 169-171.

EDUCATION

1. **Educational Psychology.** The purpose of this course is to lay the foundation for an understanding of the science of education. Better results will be obtained if this work is preceded by a course in general psychology. This course should include a thoro review of the fundamental principles of general psychology, with special attention given to heredity and the relation of mind to body. The instinctive

tendencies should be carefully studied with a view to finding out how they may be controlled and directed through education. The laws of habit formation, of learning, and of moral training should be mastered, and, in such matters as memory, drill, and fatigue, special emphasis should be placed upon the practical application of the methods, principles, and results of experimental psychology to the problems of the school. This course should include, also, a thoro treatment of interest, attention, and thinking. If time permits, mental and physical tests, and the methods and scales for measuring the school abilities should be studied, and, if possible, applied. It is advisable to use some standard text-book, such as Pyle's *The Outlines of Educational Psychology* and Thorndike's *Educational Psychology*. Three or four hours a week for one semester. (3) or (4)

2. **History of Education.** This course should give a better understanding and appreciation of present educational practices and tendencies by tracing historically the more important movements that have made the present educational situation. History gives an appreciative understanding of social practices thru connecting them intimately with the purposes in the service of which they were established. It thus prevents formalism and makes social customs plastic for improvement. When treated historically educational practices should be regarded not as mere facts, but as the solutions of problems which arose in carrying out social purposes and which determined from stage to stage the growth of the school. In studying an educational practice historically, the students should be led to understand the social situation in which it began, to appreciate the purpose which it served, and to recognize the difficulty which it was intended to overcome in realizing this purpose. It is desirable to have one library copy of each important reference book for each four students in the class. Such books as Graves' *A History of Education* (3 Vols.) are suitable for a text-book. Two hours a week for two semesters. (4)

3. **Methods of Teaching.** This course should include such topics as the course of study, the value of different units of subject-matter, interest and motive, methods of presenting the subject matter, drill, assignments, and applications. The chief stress should be laid upon problems of instruction in the elementary grades. Three hours a week for one semester. (3) (No credit for this work is given in the College of Arts and Science.)

4. **School Management.** This is a course in effective methods of class-room management. The following topics should be studied: the teacher's preparation for her work; the apportionment of the teacher's time; weekly and daily schedules; the routine of class-room management; the technique of class instruction; hygienic conditions of the class room; how to secure and hold attention; examination, graduation,

and promotion of pupils; school records and reports; teaching pupils to study economically; supervised study and the study-recitation; relation of teacher to principal, supervisor, and superintendent; important sections of the state school laws. Three hours a week for one semester. (3) (No credit for this work is given in the College of Arts and Science.)

For library equipment, see pages 171-177.

RELIGIOUS EDUCATION

1. **Fundamental Moral and Religious Values.** This course should consist of a study of the moral and religious qualities in human personality which are essential to the highest welfare of the individual and of society. It should be open only to students who are in the first year of college work. One hour a week for two semesters. (2)

In describing this course the University desires not to impose upon any denominational college restrictions that would interfere in any way with the religious faith represented by the college. For this reason the outline of a course approved by the University in an affiliated college is given below merely to indicate the general character of the work that should be required in the course and not to set specific requirements for text-books and precepts. Where the work in a junior college course varies from that indicated by the outline, it cannot be approved if it is inferior in character to the work indicated by the outline.

Kent's *Life and Teachings of Jesus* is the first text-book used in the course referred to above, which has been approved in an affiliated college. The work covered in this book begins with the first chapter and completes the sections in the main body of the book, including the section on "The Rewards of the Christian Life," page 202. The five chapters at the beginning are passed over rapidly, except the fifth chapter, but close and intensive work is done beginning with section CXXI on page 43. The character of Jesus is studied from the psychological and moral rather than from the theological point of view. The one question kept uppermost in the minds of both teacher and student is: What was the attitude and disposition of Jesus toward his fellows and toward God, as revealed in his actions and words? Each section of the book is found to furnish one or more points in the fundamentals of character, such as courage, sincerity, humility, forgiveness, etc. The purpose of the work here is not to make a mere catalogue of virtues and vices, but rather to learn from a study of the life and teachings of Jesus what he considered qualities of character essential to the highest welfare of the individual and of society.

Sections CXXII and CXXIV of the text-book are studied together, as both tell about John the Baptist. John the Baptist's appearance, manner of life, and message are emphasized together with the effect which his preaching had upon the people. In considering his message attention is given to how he shared the popular expectations concerning the kingdom, and concerning the nature of the Messiah and his mission. In the gospel references to the preaching of John, attention is called to the numerous references to fire, which stands for punishment. Jesus' answer to John (p. 69) should be considered where John, because he is in doubt about Jesus, sends from his prison two of his disciples to ask Jesus whether he is the Coming One. The answer should be compared with Luke 4:16 f. According to Jesus, his work is not that of a judge to condemn, but that of a savior to deliver and to redeem. This contrast should be carried into the next part of the text, "To what shall I liken this generation, etc?" This throws further light upon Jesus' ideal of life. Attention is then turned to the text giving Jesus' approval of John, in which he commends those moral qualities in John that he thinks worthy of imitation. These qualities which are still needed by men are courage, reliance, independence, and hardness. Jesus reveals his own nature in his judgment of John the Baptist.

The next book studied as a text-book is Coffin's *Some Christian Convictions*. About twenty pages are taken for each lesson. The teacher discusses the advance lesson with the class and assists the students to find the essential points. This book gathers up and crystallizes the points developed in the study of Kent's *Life and Teachings of Jesus*, and helps the student see how his religious beliefs may be harmonized with his total intellectual faith. A sample study of one of the chapters in this book is given below merely as suggestive of the way in which the points mentioned by the author are taught.

The first chapter of *Some Christian Convictions* deals with religion. As an introduction to this chapter an appropriate theme is the well known saying of Augustine, "Thou, O God, hast made us for thyself, and our hearts are restless till they find rest in thee." The chapter is a study of religious experience, and the content of that experience is God (Cf. p. 54). The author's reasons for saying that religion is normal experience are carefully considered, and the fact emphasized that as a normal experience it is an affair of the whole personality (p. 25). This is a brief but satisfactory discussion of religion from the psychological standpoint. A consideration of the theme, how does each man get his religious experience for himself, begins on page 32. The answer to this question is that each man must discover God for himself; that the nature of this discovery depends upon the temperament of the individual; and that the depth of the experience of God is limited by

each man's capacity, which may be cultivated, so as to increase assurance of the certainty of his knowledge.

The validity of our religious experience, a new theme, is introduced on page 42. The satisfaction given by religion to man's complex personality in all ages and the practical value of religious experience are emphasized as tests of this validity. On the basis of what is given at the bottom of page 42 a summary of the whole chapter is made.

To save the course from becoming too academic and to make it more practical, the class next reads King's *Moral and Religious Challenge of Our Times*.
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2. **The Bible as Literature.** This course should consist of a purely literary study of the Bible with a view to a knowledge of the nature of the content, and to an appreciation of the beauty, variety, and power of the Holy Scriptures as works of literary art. Two hours a week for one semester, or one hour a week for two semesters. (2)

As in the case of the course in fundamental moral and religious values, the outline of an approved course in an affiliated college is given in order to indicate the general character of the work that should be required in the study of the Bible as literature.

In the approved course referred to, Moulton's *Modern Reader's Bible* is used as a text. In view of the fact that if the student uses a text-book other than the Bible, he reads the text to the neglect of the Bible itself, the student's reading in this course is confined mainly to that portion of the Bible under consideration from day to day, while other readings are made secondary to this reading. Moulton's *A Short Introduction to the Bible as Literature* and his *The Literary Study of the Bible* as well as reference books listed on pages 177-178 of this bulletin are used in connection with discussions of readings in the Bible.

The course includes either the historic, epic, and wisdom literature, or the lyric, prophetic, and apocalyptic literature of the Bible.

When the historic, epic, and wisdom literature is studied, the work is as follows:

The first meeting of the class is devoted to such matters as learning the place of the Bible in relation to Hebrew literature and to Semitic literature, noting the differences in the order of the books in the Hebrew, Septuagint, Latin, and English versions of the Bible together with the reasons for these differences, and learning a brief account of the most important translations. The introductory work is concluded in the second meeting of the class by a review of the first chapter of Moulton's *A Short Introduction to the Bible as Literature*.

About twelve meetings of the class are devoted to the study of the historic literature. The students gain in this study a clear idea

of the more prominent characteristics of the history of the Hebrews and of the development of the New Testament church as these appeared to the writers themselves. Owing to lack of time and to the student's meagre preparation for such work, there is no detailed study of questions of criticism. Attention is given to the literary forms and to other literary characteristics of the various sections of the historic literature studied. For example, in the first recitation in historic literature the class covers *Genesis*, which contains the materials for primitive history as outlined by Professor Moulton. The attention of the class is called to the facts that the materials are chiefly in story form and that there are some history, some genealogical tables, and a few poetic fragments. The students learn to appreciate the difference between story narrative and historic narrative by comparing such passages as *Genesis* 11:1f with 14:1f. Concerning the poetic fragments, they note the parallelism which is the ground work of all Hebrew poetry, the antique meter so well suited to extemporaneous composition, and stanza lengths determined by the same considerations that determine paragraph lengths in prose. With regard to the content of the book, they learn the first portion as giving the beginnings of the world, man, crime, work, musical instruments, implements of manufacture, languages, etc.; the second portion as giving the account of God's sifting of peoples in selecting a chosen family through which he would raise up a nation as his own peculiar people; and the third portion as giving the story of Joseph, which is intended to show how the Israelites were transplanted from Palestine to Egypt.

Ten to twelve meetings of the class are devoted to epic literature. The first recitation in this part of the work is given to a consideration of the criteria for judging a story so as to evaluate it properly. The student reads the story materials of the historic sections anew and all of the epic books of the Bible, although there is not time to treat all of this in detailed class discussion. During the recitation hours the different types of stories are considered and the best ones of each class studied intensively. Recitations are devoted to a study of the stories of Cain and Abel, Joseph, the Ten Plagues, Balaam, Samson, Ruth, Elijah, Elisha, Daniel, Tobit, and Esther. As a result of the study of the epic literature, the student should be acquainted with the epic materials of the Bible, their character, qualities of excellence, etc.

The wisdom literature is covered in about ten recitations. An introductory recitation treats of the rise of wisdom literature, its spirit, development, and forms. One recitation is devoted to each wisdom book, except in the case of the *Book of Job*, to the study of which two or three recitations are devoted. The students acquire an appreciation of the most striking qualities of these books, a knowledge of their contents, and an acquaintance with the development of wisdom literature in general.

When the lyric, prophetic, and wisdom literature of the Bible is studied, the work is as follows:

About ten or twelve recitations are given to a study of the different varieties of lyric literature. The *Book of Psalms*, *Lamentations*, *Song of Songs*, and parts of the *Book of Job* and of the prophetic books are considered. The lyrics which grew out of the dance are traced in their development through the processional ode and anthem to meditation. The lyrics which grew out of the wail or dirge are considered, *Lamentations* being studied as the most elaborate example of this type. In the study of the *Song of Songs* attention is given to how the arrangement and interpretation depend on whether the book is considered as a drama, as a lyric idyl, or as a collection of songs used with the seven days' wedding feast. A concluding recitation is devoted to the general consideration of Hebrew poetry, verse, metre, and the means of securing beauty, variety, etc.

In the study of prophetic literature, to which about fifteen to eighteen meetings of the class are devoted, the introductory work defines prophecy, indicates its general spirit, names the literary forms used by prophetic writers, and characterizes briefly and illustrates each form. The students then study the historic setting of each prophet and the circumstances calling forth his message. Then the students by reading the book become acquainted with the message, point of view, and spirit of the prophet. Special attention is given to the literary forms used and to their qualities and degrees of excellence.

The apocalyptic literature of *Daniel* and the *Book of Revelations* are covered in a briefer time than any other division of the work,—four to five recitations. Aside from the general content of the books, the students give attention to the chief characteristics of this form of literature and to the influences which produced them.

For library equipment, see pages 177-178.

PHYSICAL TRAINING

1. **Physical Training, Practical Course.** This course includes (a) marching, floor tactics, and class evolutions; (b) graded free exercises and drills with light apparatus and developing appliances, graded club swinging, dumb bells, etc., graded balance exercises, and dancing; (c) graded apparatus exercises; and (d) introductory graded exercises in athletics, gymnasium drill, drills in hand tennis, handball, basketball, and volley ball.

The course in physical training should be given the first year. A suitable room with plenty of light and air and free from obstructions should be available. The equipment should include Indian clubs, dumb-

bells, and barbells in suitable number for class drill; some apparatus such as leather buck, leather horse, ladders, rings, and mats for graded work; playing space for games, and reasonable locker, bathing, and dressing facilities. The gymnasium costume should be required.

In the fall and spring the work should include outdoor games such as hockey, tennis, basketball, playground ball, and track athletics. Swimming is excellent if facilities are possible.

The regular physical work should be supplemented by occasional talks on dress and posture, on personal, home, and public hygiene, and on general matters of health. Three hours a week for two semesters. (2)

For laboratory equipment, see page 94.

For library equipment, see pages 178-179.

II

SUGGESTIONS FOR THE EQUIPMENT OF LABORATORIES

GENERAL INFORMATION

The biological laboratories should be located on the north side of the building. The dimensions of each room used for biological work should be much greater from east to west than from north to south, since it is desirable to have as much north light as possible. The laboratories for work in physical sciences may be located advantageously on the south side of the building. Since sun light is often needed for work in physics, it is well to have one or two windows in the physics laboratory exposed to the sun. All laboratories should be supplied with gas, water, and electricity.

In the construction of a new building which is to contain a laboratory, it is important to remember that the windows should be high, running up to the ceiling; that the rooms should not be so deep from the windows on the north to the opposite wall on the south as to render it difficult for light to get readily across, and that the distance from the top of the window sills to the floor should be the same as the height of the laboratory tables. In horizontal measurement, the windows and intervening spaces of brick or stone should be about equal in width. Therefore, in horizontal measurement the north front of a laboratory should be nearly half glass. Too great care cannot be exercised to secure perfect ventilation. The temperature should be kept uniform.

The class-rooms for recitations and lectures should be near the laboratories, so that apparatus and specimens may readily be transferred to and fro. Each room of this kind should contain a substantial demonstration table equipped with gas, water, and electricity, and provided with suitable drawers and cupboards. The room should contain also a projecting lantern, and should be curtained with opaque enameled cloth so that it can be quickly darkened. In Missouri climate there are enough clear days to warrant the use of sunlight in the class-room in physics. One of the best arrangements is to place the end of the demonstration table toward a south window. Sunlight can then be thrown the length of the table by a mirror (heliostat) placed in the window.

In the planning of laboratories, provision should be made for the storage of apparatus and supplies by setting aside several small rooms conveniently located to serve as preparation and service rooms. Cases

should be provided for demonstration apparatus, models, charts, microscopes, and many other laboratory accessories.

It is not economy to buy too cheap apparatus. Before purchasing one should submit lists to various dealers for bids. Because of the war, the cost of equipment will be found to vary from the prices quoted in this bulletin. The names and addresses of dealers are given in this bulletin in connection with lists of laboratory supplies needed for work in the several sciences.

PHYSICS

In equipping a laboratory for physics, it is necessary to plan a definite list of experiments and to buy the apparatus necessary for these experiments. Because of this fact, it is not feasible to recommend a definite list of laboratory apparatus. The teacher should first choose the laboratory manual, and then the particular experiments. The apparatus must be chosen to fit these experiments. The following is a list of apparatus suitable for use in the class-room for demonstrations to be given by the teacher. Since the experiments selected for the course may vary with the teacher, the text, and local conditions, the list is intended to be suggestive rather than complete in detail. It does not include, furthermore, such common things as meter sticks, glassware, and weights. This list includes apparatus for both Course 1 and Course 2. If only Course 1 is given, the list should be correspondingly reduced. Many suggestions may be obtained by studying the larger apparatus catalogues, since much of the apparatus illustrated in these catalogues is intended for demonstration work. The equipment should be of such quality and quantity that a sufficient number of experiments of college grade can be performed. Much of the apparatus should be of a more accurate type than that commonly used in high schools.

Air pump to go to 3mm. pressure, bell-jars and accessories.

Guinea-and-feather tube

Rotator and accessories

Model wheel and axle

Seven-in-one apparatus (Spirometer)

Barometer tubing (glass)

Simple barometer

Archimedes principle, cylinder and bucket

Balance suitable for demonstrations, sensitive to 1-5 gram

Models of lift and force pumps

Cartesian diver

Hydraulic press or hydrostatic bellows

Set of universal supports, clamps, etc.

Running water and gas at lecture table

Alternating and direct currents available at table
Aspirator, or water pump
Lantern for projection
Hydrometers, variable immersion type
Magdeburg hemispheres
Apparatus for illustrating expansion by heat, as ring and ball
Simple air thermometer
Hope's apparatus for maximum density of water
Specific heat apparatus (paraffin cake and metal balls)
Three or four barometer tubes with liquids above mercury to show vapor pressures
Round bottom flasks for boiling water under reduced pressures
Apparatus for freezing water under air pump
Pair of reflectors, iron ball, blackened-bulk air thermometer for radiation experiments
Fire syringe
Models of gas and steam engines
Thermo-couple and thermopile
Wave model, or apparatus for illustrating wave motions
Apparatus for bell-in-vacuo experiment
Siren disk and Savart's wheel (to fit rotator)
Several organ pipes
Several tuning forks—pitch should correspond to fundamental and overtones of one of the organ pipes
Two forks of same pitch mounted on boxes for showing resonance and beats
Sonometer
Electroscope suitable for projection or class use
Hard rubber rods, hard glass, pith balls, etc.
Electrophorus
Static machine (Toepler-Holtz or Wimshurst)
Faraday ice pail experiment
Four Leyden jars and discharger
Parallel plate condenser with movable plates, sphere and cylinder with rounded ends, on insulated stands
Two bar magnets, filings, tacks, etc.
Magnetic needle about 4 inches long mounted as a compass
Dipping needle
Lecture table D'Arsonval galvanometer
Bank of incandescent lamps, or other variable rheostat, that can be put on power circuit
Arago disc (to fit rotator)
Lecture table ammeter and voltmeter
Coils for showing induced currents

Coils and iron core for assembling a simple transformer
Induction coil
A coil to use as earth inductor
Simple dynamo and motor
Apparatus to show electrolysis of water
Apparatus to show copper plating
Geissler tubes
Crookes tube to show cathode ray phenomena
Set of small portable white screens for table
Several projection lenses, 8", 12", 15", 24" focal lengths, mounted in reading glass mounts
One diverging lens, 8" focus, mounted
Convex and concave mirrors
Prism and adjustable slit, for projection of spectra
Spectrum tubes of hydrogen and helium
Glass water tank for refraction experiments
Replica diffraction grating
Piece of clear calcite (Iceland spar)
Newton's rings apparatus (for projection)
Pair of tourmalines (to show polarization)

DEALERS IN PHYSICAL APPARATUS

Bausch and Lomb Optical Co., Rochester, N. Y. (projection apparatus); James G. Biddle, 1211 Arch St., Philadelphia (importer); Central Scientific Co., 460 E. Ohio St., Chicago (general supplies); Wm. Gaertner & Co., 5347-9 Lake Ave., Chicago (general apparatus); Leeds and Northrup Co., 4901 Stenton Ave., Philadelphia (resistance boxes and galvanometers); C. H. Stoelting Co., 121 North Green St., Chicago (general supplies); Weston Electrical Instrument Co., Newark, N. J. (ammeters, voltmeters and watt-meters).

CHEMISTRY

In laboratory equipment, the two main items of expense are the tables and the individual outfits of apparatus for use of the students. Substantial tables supplied with water, gas, and sinks should be provided. Two tables each 16 feet long and with lockers and drawers on opposite sides will accommodate two sections of 16 students. The first cost of the laboratory desks including plumbing will range from \$15 to \$20 a lineal foot. The individual outfits of apparatus, at the relatively high prices that prevail at the present time, will cost approximately \$18 each. The major portion of the outfit of apparatus required for the first courses will also serve for the laboratory work in qualitative analysis and organic chemistry. Some special pieces of appa-

ratus and additions to general laboratory equipment should be provided for these courses. Suction filters, several hand centrifuges, and a set of about six individual reagent bottles will be required for the students in qualitative analysis. Condensers, distilling flasks, thermometers, and water baths must be added for the work in organic chemistry.

The laboratory should be provided also with a good draft hood, reagent and balance shelves, a set of uniform reagent bottles for both solids and solutions, a barometer, and several balances and weights including balances for quantitative experiments. An automatic water still and a blast lamp and bellows are essential to the equipment. A steam bath, hot plate, and a drying oven should be provided. In planning a chemical laboratory a separate ventilating system should be installed.

In addition to tablet arm chairs and a teacher's desk, a demonstration table equipped with water, gas, and electricity is needed for the class-room experiments to be conducted by the instructor. Ample blackboard space is required. A projecting lantern is very serviceable, and for its effective use opaque shades for the windows should be provided.

Ample space and shelving are necessary for housing the stock of reagents and apparatus. A separate storeroom should be provided for this purpose, and this room should be conveniently located for dispensing apparatus to students. Moreover, a stock of lecture-room demonstration apparatus and specimens should be added and suitable cases should be provided for it.

The larger and more important forms of apparatus and accessories required for demonstration purposes are as follows:

Cylinders of compressed oxygen, liquid sulphur dioxide, liquid carbon dioxide, liquid chlorine and liquid ammonia.

Several fair sized Kipp generators

Wall charts of the elements, the periodic system, international metric system

Spectroscope and spectrum tubes of some of the common and rare gases

Induction coil

Barometer tubes

Dewar flasks and tubes

Demonstration balance and weights

Gas holder

Hoffman electrolysis apparatus

Apparatus for the volumetric composition of steam

Ozone tube

Galvanometer

Analytical balance and weights

Standard solutions of an acid and a base

Specimens of the common minerals

Samples of the raw material and some manufactured products of several chemical industries

25 lbs. mercury

10 grams of platinized asbestos

Platinum wire and sheet platinum

(For list of dealers in chemical supplies, see page 179.)

BOTANY

GENERAL BOTANY

Equipment for twelve students working at the same time.

The list of apparatus given below represents a fairly complete equipment adapted for a general course. Some pieces of apparatus may well be omitted and others added. Various adaptations may be made in the use of glassware, etc. The list includes the materials that have been found very satisfactory in actual experience.

In order to indicate the materials briefly and definitely, references are made by numbers to items listed in the catalogue of the Arthur H. Thomas Co., West Washington Square, Philadelphia, Pennsylvania. Practically the same apparatus can be obtained from other firms the names and addresses of which are given after the lists of equipment for general botany and general bacteriology.

INDIVIDUAL EQUIPMENT

1 compound microscope with two objectives	\$25.00 to \$30.00
(The objectives giving the best results are the 16 mm. and the 4 mm.)	
1 pair small fine-pointed scissors	
1 scalpel	
1 pair forceps, medium fine with straight points	
Several microscope slides, 3x1 inches	
A few cover glasses, 18 mm. No. 2	
Small amount of lens paper	

GENERAL EQUIPMENT

Apparatus

6 aluminum shells, Ganong, for transpiration experiments (Bausch & Lomb Optical Co.)	1.75
1 balance, counter, in ebony box with marble top and heavily nickel plated pans, Dia. pans 8 in. (A. H. Thomas Co., 21520)	16.00
1 balance weights, in polished block, 1 g. to 1 k. (A. H. Thomas Co., 21656) per set	5.00

6 battery jars, 4 liter capacity, height 225 mm., diam. 150 mm. (A. H. Thomas Co., 21800), each	\$.65
12 battery jars, 1 liter capacity (A. H. Thomas Co., 21800) each .....	.25
3 bell-glass, high form, with ground flange, height 17 in. diam. 8½ in. (A. H. Thomas Co., 21936), each	1.75
12 bladders, animal, dried, assorted sizes (A. H. Thomas Co., 21960), per doz.	1.00
20 bottles, wide mouth, American flint glass, for cork stoppers, cap. 500 cc. (A. H. Thomas Co., 22210), per 10 .....	.90
20 bottles, narrow mouth, American flint glass, for cork stop- pers, cap. 500 cc. (A. H. Thomas Co., 22200), per 10 .....	.85
50 bottles, dropping, capacity 50 cc. (A. H. Thomas Co., 22132), each .....	.25
2 boxes, geotropic and phototropic	
6 bunsen burners, (A. H. Thomas Co., 22816), each .....	.25
Card board .....	.13
6 clamp (Lincoln) for burettes (A. H. Thomas Co., 24598), each .....	.75
12 clamps, test tubes, Stoddard nickled spring wire, small, 4½ inches long (A. H. Thomas Co., 24630), each .....	.10
1 clamp stand (Ganong) portable (Bausch & Lomb Optical Co.)	8.00
1 clinostat (Ganong) demonstration (Bausch & Lomb Optical Co.)	22.50
Corks, assorted sizes	
1 cork borer of hard brass, No. in set 6. (A. H. Thomas Co., 25122)	1.00
3 cylinders, graduated 100 cc. capacity (A. H. Thomas Co., 25770), each .....	.50
2 cylinders, graduated 500 cc. capacity (A. H. Thomas Co., 25770), each	1.00
6 dewar flasks or thermos bottles	
100 filter paper, B. & L. A1, medium weight, in sheets 450 x550 mm. (Bausch & Lomb Optical Co., 14166) per 100 sheets	1.75
20 flasks, Erlenmeyer, capacity 120 cc. (A. H. Thomas Co., 28176), each .....	.13
6 flasks, Erlenmeyer, capacity 500 cc. (A. H. Thomas Co., 28180), each .....	.20
12 funnel tubes, straight with thistle top, length 400 mm. (A. H. Thomas Co., 28744), each .....	.12
12 funnels, of clear white glass, with stem ground to point. Diam. 120 mm. angle 60° (A. H. Thomas Co., 28544), each .....	.20

2 light screens, Ganong, part leaf form (Bausch & Lomb Optical Co.), each	\$ 1.25
6 glass plates, 12x12 inches	
12 glass plates, 5x5 in.	
½ lb. glass rod, 1 cm. diam. (A. H. Thomas Co., 29856), per lb. ....	.40
¼ lb. glass rod, diam. 6 mm. (A. H. Thomas Co., 29856), per lb. ....	.40
1 K glass tubing, 6 mm., 8 mm., 29 mm. inside diam. (A. H. Thomas Co., 29864) per lb. ....	.40
1 incubator, Freas electric	75.00
India Ink	
Labels, Dennison's gummed	
6 lamps, alcohol, cap. 60 cc. (A. H. Thomas Co., 30800), each .....	.40
12 books lens paper, Japanese (A. H. Thomas Co.)	
12 pans, granite iron, diam. 6", depth 2½"	
Pins	
24 pipettes, dropping, 4" long with straight top and rubber bulb, (A. H. Thomas Co., 43428), per doz. ....	.40
Pipettes, volume or transfer (A. H. Thomas Co., 43504), cap. 1cc., each .....	.10
12 plates, white	
6 retorts, with tubulature but without glass stopper, cap. 150 cc. (A. H. Thomas Co., 46020), each .....	.22
1 lb. rubber stoppers, No. 10, 2 holes, diam. top, 50 mm., bottom 42 mm., No. per. lb. 7 (A. H. Thomas Co., 46180), per lb.	2.00
1 yd. rubber cloth, 1 yard wide	
10 ft. rubber tubing, red or antimony, inside diam, 5 mm. (A. H. Thomas Co., 46216), per foot .....	.10
10 ft. rubber tubing, red or antimony, inside diam. 8 mm. (A. H. Thomas Co., 46216), per foot .....	.16
20 ft. rubber tubing, white, inside diam, 8 mm. (A. H. Thomas Co., 46220), per foot .....	.10
1 demonstration spectroscope, Ganong (Bausch & Lomb Optical Co.)	24.50
String	
6 supports, apparatus, tripod base, copper plated rod, medium, height of rod 50 cm. (A. H. Thomas Co., 47676) .....	.45
500 test tubes, with lip, thin walled, length 120 mm., diam. 15 mm., (A. H. Thomas Co., 47944), per 100	1.55
20 test tube brushes on tinned wire, bristle with bristle end (A. H. Thomas Co., 22496), each .....	.06
6 test tube supports (A. H. Thomas Co., 48020) with 6 holes, each .....	.30

6 thermometers, chemical, centigrade, graduate to 100° (A. H. Thomas Co., 48212), each	\$ 1.10
6 tripods (A. H. Thomas Co., 48616), 3 rings, each .....	.40
10 tubes, fermentation (A. H. Thomas Co., 27600), each .....	.35
24 tumblers	
100 vials, homeopathic, short form with neck, flat bottom and cork stopper, capacity 3 drachms, height 63 mm., diam. 17 mm. (A. H. Thomas Co., 48912), per gross	2.00
24 watch glasses, Syracuse, with ground bevel (A. H. Thomas Co., 49028), each .....	.06
6 rings, support, diam. 3¾" (A. H. Thomas Co., 46072), each .....	.17
6 clamps, (A. H. Thomas Co., 24534), each .....	.40

Chemicals

50 g. iodine, resublimed.	
50 g. potassium iodide, C. P.	
500 g. sodium chloride, C. P.	
500 g. hydrochloric acid, C. P.	
1 k. potassium hydroxide, C. P.	
100 g. eosin (soluble in water)	
500 g. corn starch	
4 litres alcohol (ethyl) 95%	
500 g. glucose	
500 g. cotton	
100 cc. benzine	
10 g. diastase	
50 g. zinc chloride, C. P.	
1 k. sulphuric acid, C. P.	
500 cc. olive oil	
1 g. osmic acid	
10 g. Sudan III	
500 g. nitric acid, C. P.	
500 g. ammonia, C. P.	
500 g. barium hydroxide, C. P.	
3 k. mercury	
100 cc. ether	
500 g. cane sugar	
50 g. potassium nitrate, C. P.	
50 g. dihydrogen potassium phosphate, C. P.	
50 g. magnesium sulphate, C. P.	
50 g. iron chloride, C. P.	
50 g. potassium chloride, C. P.	
50 g. sodium nitrate, C. P.	

- 50 g. dihydrogen sodium phosphate, C. P.
 - 50 g. sodium sulphate, C. P.
 - 50 g. magnesium chloride, C. P.
 - 50 g. ammonium tartrate, C. P.
 - 50 g. calcium phosphate, C. P.
 - 50 g. mercuric bichloride, C. P.
 - 50 g. copper sulphate, C. P.
 - 100 g. sodium potassium tartrate, C. P.
 - 100 g. sodium hydroxide, C. P.
- } For Fehling's solution

Sets of Prepared Microscopical Slides

(Each set includes twelve slides. Items starred are most important.)

- *Fern—transverse section through stem of *Pteris aquilina*
- Fern—transverse section through leaf of *Polypodium*
- *Fern—transverse section through prothallus for archegonia and antheridia
- Fucus—transverse section through oogonial conceptacles
- Fucus—transverse section through antheridial conceptacles
- *Leaf—transverse section through leaf of dicotyledon (orange)
- *Lily—transverse section through anther
- *Lily—transverse section through ovary; development of embryo sac
- Lily—pollen grains
- Lily—germinating pollen grains
- Marchantia—transverse section of thallus
- *Marchantia—longitudinal section through antheridial disc
- *Marchantia—longitudinal section through archegonial disc for archegonia
- *Marchantia—longitudinal section through archegonial disc for sporophytes
- Mildew—section of perithecia on willow or lilac
- Mold—germinating spores
- Moss—longitudinal section through antheridial branch for antheridia
- Moss—longitudinal section through archegonial branch for archegonia
- *Mushroom—section through pileus for basidia
- *Pine—transverse section through staminate cone
- *Roots—longitudinal section of root tips (hyacinth or onion)
- Roots—transverse section of root (sunflower)
- *Rust—transverse section of barberry leaf showing aecidium cups and pycnidia
- Stems—transverse section of corn
- *Stems—transverse section of castor bean
- *Stems—longitudinal section of castor bean
- *Stems—transverse section of 1 yr. and 3 yr. old basswood stem

Plant Material

For physiological work

Apples
Barley or wheat seedlings, 5-7 days old
Beets
Begonia
Canna rhizome
Elodea
Geranium
Hyacinth bulbs
Impatiens, 3-8 weeks old
Mimosa pudica; plants 2-3 months old
Nasturtium
Onion
Potato tubers
Radish seedlings, 5-7 days old
Squash plants, 8-10 weeks old
Sunflower, 3-8 weeks old
Sweet potato roots
Tradescantia, flowers and leaves
Variegated geranium
Yeast cultures

For morphological work

(Items starred may be preserved)

Angiosperms—flowering branches of representative families
Angiosperms—collection of fruits of different types
Angiosperms—leaves of various types
Angiosperms—roots of various types
Angiosperms—stems of various types
Chlamydomonas—culture
*Equisetum—with strobili
*Fern—leaves with spore sacs
Fern—living plants
*Fern—rhizomes (*Pteris aquilina*)
*Fucus—male and female plants
*Marchantia—antheridial branches
*Marchantia—archegonial branches
*Marchantia—sporophytes
*Marchantia—thallus with cupules
*Moss—antheridial plants
*Moss—archegonial plants
*Moss—protonemata

- *Moss—sporophytes
- *Mushrooms
- *Pine—mature ovulate cones preserved dry
 - Pine—seedlings
- *Pine—staminate branches
 - Pine—vegetative branches
- Pleurococcus
- Powdery mildew—cultures of barley mildew
 - Powdery mildew—dried leaves of willow or lilac bearing perithecia
 - Rhizopus nigricans—cultures
- *Selaginella—with strobili
- Spirogyra—vegetative
- *Spirogyra—zygospores
- *Wheat rust—barberry leaves with aecidial cups
 - Wheat rust—teleuto stage on wheat preserved dry
 - Wheat rust—uredo stage on wheat preserved dry
 - Zamia—entire plant
- *Zamia—ovulate cones at two or three stages of development
- *Zamia—staminate cone

Seeds

- 2 lb. barley
- 1 lb. bean
- $\frac{1}{4}$ lb. castor bean, large seeded form
- 3 lb. corn
- 1 oz. Impatiens
- 1 oz. Mimosa pudica
- $\frac{1}{2}$ lb. nasturtium
- 4 lb. pea, any wrinkled variety
- $\frac{1}{4}$ lb. pine, large seeded form
- 1 oz. radish
- $\frac{1}{4}$ lb. squash
- $\frac{1}{4}$ lb. sunflower, giant Russian
- $\frac{1}{2}$ lb. wheat

GENERAL BACTERIOLOGY

Equipment for twelve students working at the same time

A well illuminated room with gas and running water is necessary. A desk of convenient size provided with lockers for the equipment of individual students should be provided.

INDIVIDUAL EQUIPMENT

1	box for slides, wood cap, 12 slides
6	bottles, dropping, cap. 50 cc. for stains, etc.
1	cup, porcelain
5	fermentation tubes, medium size
2	flasks, Erlenmeyer form, cap. 100 cc.
2	flasks, Erlenmeyer form, cap. 500 cc.
¼	oz. cover glasses, 18 mm. square, No. 1
1	forceps, Stewart cover glass
1	graduate, cylinder, 10 cc. cap.
2	glass rods, 6 mm. diam. 8" long
5"	platinum wire, No. 27 B & S guage
20	petri dishes, 10 mm. deep, 100 mm. diam.
3	pipettes, volumetric, cap. 1 cc.
1	slide, culture, hollow ground
12	slides, microscopical, 25 mm. x 75 mm.
100	test tubes, 16 mm. x 120 mm.
1	test tube brush
1	thermometer, 0 to 100 degrees C.
5	tumblers, glass
1	paper, lens

GENERAL EQUIPMENT

Apparatus

1	air pump, Chapman's
1	autoclave, upright, 26"x 14"
1	balance, Harvard trip with weights 1 g. to 1 k.
6	boilers, double, capacity 1500 cc.
1	bottle, aspirator, for distilled water, Cap. 12 litres
1	bottle, aspirator, for mercuric chloride, Cap. 12 litres
6	bottles, balsam
12	bottles, immersion oil
12	burners, Bunsen, 1 tube
2	burners, Bunsen, 4 tube
6	burettes, 50 cc. Cap. Grad. to 1/10 cc.
	Corks, assorted sizes
1	cork borer
3	cups, granite iron, graduated, Cap. 1 litre
2	files, triangular
12	flasks, Erlenmeyer, Cap. 1000 cc.
12	funnels, 6" diam.
2	funnels, 2" diam.

3	graduates, cylinder form, Cap. 500 cc.
1	ice box
1	incubator, preferably for electricity
6	kettles, granite iron, Cap. 10 litres
	Labels, gummed, for slides and cultures
3	micrometers, stage
12	micrometers, ocular
12	microscopes, with two oculars (1" and 2"), with three ob- jectives (16 mm., 4 mm., and 2 mm. oil immersion) and with a sub-stage condenser
	Paper, black
	Paper, filter, circles 6" and 8" diam.
	Paper, wrapping
12	rods, glass 1 cm. diam. 15" long
12	rings for supports, 3" diam.
1	steamer, Arnold pattern
1	sterilizer, hot air, Lautenschlager pattern
	Stoppers, rubbers, assorted sizes
12	supports, with triangular base and rod 30" long
	Tags
3	thermometers, 0 to 250 degrees C.
6	tripods, 6" diam.
500	grams tubing, glass, diam. 6 mm. and 8 mm.
50'	tubing, rubber, white, 7 mm. diam.
25'	tubing, rubber, red, 5 and 7 mm. diam.
3	spools wire, copper, assorted sizes

Chemicals

2	k. bacto-peptone
2	k. agar
100	g. alcohol, methyl
4	l. alcohol, ethyl
50	g. anilin oil
500	g. balsam, Canada
100	g. barium oxide
1	lb. beef extract, Liebig's in $\frac{1}{4}$ lb. containers
1	lb. carbolic acid
200	g. cedar oil for immersion
100	g. chloroform
100	g. copper sulphate, C. P.
25	lb. cotton batting
2	lb. cotton, absorbent
500	g. dextrose
50	g. diphenylamine

50 g. ferric chloride C. P. ....	.....
1 lb. formalin .....	.....
50 g. fuchsin .....	.....
2 k. gelatine .....	.....
50 g. gentian violet .....	.....
5 lb. hydrochloric acid C. P. ....	.....
50 g. iodine, resublimed .....	.....
500 g. levulose .....	.....
100 g. litmus, cubes .....	.....
100 g. maltose .....	.....
1 k. mercuric bichloride .....	.....
50 g. methylene blue .....	.....
25 g. naphthylamine .....	.....
1 lb. nitric acid, C. P. ....	.....
50 g. phenolphthalein .....	.....
50 g. potassium acid phosphate .....	.....
50 g. potassium iodide .....	.....
50 g. potassium nitrate .....	.....
50 g. Rochelle salts .....	.....
500 g. saccharose .....	.....
50 g. sodium chloride .....	.....
50 g. sodium nitrite .....	.....
1 lb. sulphuric acid .....	.....
½ lb. vaseline .....	.....
2 lb. xylol .....	.....

DEALERS IN LABORATORY APPARATUS AND SUPPLIES FOR GENERAL BOTANY
AND GENERAL BACTERIOLOGY

Bausch & Lomb Optical Co., Rochester, N. Y. (microscopes, apparatus, chemicals); Botanical Laboratory, University of Notre Dame, Notre Dame, Ind. (microscopical preparations); Cambridge Botanical Supply Co., Cambridge, Mass. (plant material, apparatus); Eimer & Amend, New York, N. Y. (apparatus, chemicals); Henry Heil Chemical Co., St. Louis, Mo. (glassware and chemicals); Marine Biological Laboratory, Woods Hole, Mass. (plant material); M. S. Markle, Earlham College, Earlham, Ind. (microscopic slides and preserved material); The Plant Study Co., Cambridge, Mass. (microscopical preparations and plant material); E. H. Sargent & Co., Chicago, Ill. (apparatus and chemicals); Spencer Lens Co., Buffalo, N. Y. (microscopes); The Arthur H. Thomas Co., West Washington Square, Philadelphia, Pa. (apparatus, chemicals).

ZOOLOGY

*Equipment for ten students working at the same time **

The list given below represents the minimum equipment with which a properly qualified teacher can be expected to conduct work of college grade. A properly qualified teacher can devise at small cost many articles of equipment, mainly home-made additions to the list. Running water and adequate drainage is an essential part of the facilities required, and gas is almost a necessity. Storage tanks lined with cement or galvanized iron are necessary for keeping living animals. It is desirable that these tanks be easily accessible, although they need not be in the laboratory room. A synoptic museum representing the phyla of the animal kingdom is a valuable adjunct which teachers should be encouraged to develop, and for which the necessary funds for jars, boxes, and cases should be provided. The furniture of the laboratory should include ample shelf and cupboard space for storing and protecting from dust all apparatus and supplies not in use. Since charts are a valuable adjunct to teaching, a beginning should be made with some collection like the Goder-Heimann series, which should be supplemented, as the department grows, by other charts, either purchased or home-made. Paper and drawing instruments are needed for making charts. Convenient dust-proof storage space is needed for a chart collection. Lantern slides have a similar value, and with the recent reduction in cost and perfection of projection devices, it should be possible to secure for the use of one or more departments a good modern lantern fitted for opaque, slide, and microscopic projection. Some provision should be made in connection with janitor or other service for assistance in caring for material and apparatus, and in collecting living material for class use.

List prices are given from which a varying discount may be expected. Owing to the war the list prices are liable to change.

INDIVIDUAL EQUIPMENT

10 compound microscopes \$25 to \$30 each	\$250.00 to \$300.00
Laboratory tables, allowing a space at least 2 by 3 feet for each student and having drawers or lockers and heavy white pine or hardwood tops, \$20 to \$40 per table	\$40.00 to 80.00
10 pairs medium scissors	4.00
10 pairs fine pointed forceps	3.00
10 pairs heavy forceps	4.00
10 scalpels, medium	3.50

*This list need not be substantially increased until the number of students exceeds thirty.

20 dissecting needles	\$ 1.00
10 dissecting lenses, one-inch focus	12.00
2 gross glass slides, 3x1 inches	2.50
4 ounces cover glasses, $\frac{3}{4}$ inch square	3.50
20 Syracuse watch glasses	1.25
20 pipettes, with rubber bulbs .....	.75
1 lot guarded bristles .....	.50
1 pkg. filter paper .....	.50
10 dissecting pans, about 6x10 inches, with wax in bottom	5.00

GENERAL EQUIPMENT

1 balance, with weights	5.00
1 microtome and knives	75.00
1 microscope, with condenser and extra lenses	50.00
1 dissecting microscope	25.00
1 paraffine bath	50.00
1 pair field glasses, for bird study	10.00
1 aquarium, rectangular and with glass sides	10.00
2 aquarium tanks, 3 or 4 ft. square and 10-12 inches high, of cement or heavy wood, lined with galvanized iron and equipped with running water. These are for storage of living specimens	30.00
10 glass aquarium jars	15.00
10 crystallization dishes, 10-12 inches	15.00
20 finger bowls	4.00
10 stender dishes, 2 to 3 inches diameter	1.25
3 lb. glass tubing, assorted sizes	2.50
20 feet rubber tubing, assorted sizes	3.00
25 fruit jars, with large mouths	2.00
25 test tubes .....	.50
3 waste cans of galvanized iron or crocks	3.00
20 dropping bottles, ground stopper and pipette	3.00
100 vials, assorted sizes	3.00
50 bottles, wide mouths, assorted sizes	5.00
1 lot corks, assorted sizes	1.00
5 glass battery jars or covered crocks, for storage of larger specimens	4.00
10 insect boxes, \$0.50 to \$2.00 each	\$5.00 to 20.00
1 lot insect pins, assorted sizes	1.00
5 insect pinning boards, home-made	2.00
2 tripods .....	.50
2 Bunsen burners, for gas .....	.40
2 alcohol lamps	1.00
1 mortar and pestle, Wedgewood .....	.50

1 lot, glass stoppered bottles, assorted sizes	\$ 5.00
12 Coplin staining jars	4.00
3 graduates, 25, 100, 500 cc. capacity	1.75
1 nest of beakers, 20 to 500 cc. capacity	2.00
1 lot common window glass panes, assorted sizes	2.00
3 glass funnels, plain, 50, 100 and 150 mm. in diameter .....	.50
3 glass flasks, capacity about 500 cc. ....	.60
15 slide boxes for 1"x3" slides	1.25
1 lot gummed labels, assorted sizes .....	.50
2 balsam bottles .....	.50
1 minnow seine	3.00
3 collecting nets, mounted	4.00
1 pair rubber boots, for collecting	6.00
3 insect nets, home-made .....	.75
2 botanical collecting cans or canvas haversacks, for carrying collecting bottle and jars	2.00
1 lot of additional scissors, forceps, scalpels, needles, hand-lenses, glass slides, covers, watch glasses, pipettes, dissecting pans, etc., for use of teacher and for general laboratory use	15.00
1 lot of assorted jars, bottles and vials of clear glass, suitable for display of permanent demonstration specimens	15.00
4 insect cages, home-made	2.00

REAGENTS AND CHEMICALS

10 lbs. formalin	3.00
1 gal. alcohol, 95%	4.00
1 qt. absolute alcohol	2.00
1 lb. ether	1.75
1 lb. mercury	1.00
2 gals. distilled water .....	....
1 lb. glycerine	1.00
1 lb. turpentine .....	.50
½ lb. cedar oil	1.00
3 ozs. balsam, in xylol .....	.75
3 lbs. xylol	3.00
1 lb. glacial acetic acid .....	.75
1 lb. sulphuric acid .....	.40
1 lb. hydrochloric acid .....	.25
1 lb. nitric acid .....	.60
½ lb. picric acid, crystals	1.00
½ lb. corrosive sublimate .....	.75
1 lb. chloroform	1.00
1 lb. caustic potash .....	.50

$\frac{1}{2}$ lb. potassium cyanide, fused lumps	\$.55
1 oz. iodine, resubl. ....	.75
$\frac{1}{2}$ oz. methyl green .....	.75
6 ozs. haemalum, solution .....	.75
3 ozs. acid carmine, solution	1.00
$\frac{1}{2}$ oz. orange G, powder .....	.60
1 oz. pith, for sectioning .....	.10
$\frac{1}{2}$ oz. optical carmine .....	.60

DEALERS IN ANIMALS FOR CLASS WORK

F. J. Burns & Co., 214 W. So. Water St., Chicago, Ill.; A. A. Sphung, North Judson, Ind.; Alex. Nielson, Venice, Erie Co., Ohio (living and preserved material); Harpswell Laboratory, Tufts College, Mass.; Marine Biological Laboratory, Supply Department, Woods Hole, Mass. (marine specimens); Powers and Powers, Station A, Lincoln, Nebr. (living hydra, protozoa, etc. and microscopic slides).

A Zoological Supply Department is maintained by the University of Missouri for the purpose of furnishing the high schools of the state living and preserved material from the local fauna and also the marine forms ordinarily used. In addition to the forms used for student dissection, simple museum specimens and microscopic preparations may be secured. All supplies will be furnished at cost, and the schools will further have the advantage of low transportation charges and prompt delivery. This department is not in operation between June 1st and October 1st. The current price-list and further information may be obtained by addressing the Zoological Supply Dept., Biology Bldg., Columbia, Mo. If the extension of this service to include material needed by Junior Colleges seems warranted, the necessary additions to the list can be made. In all probability college teachers will find it more satisfactory to collect their own material or to order from larger dealers, unless their orders are for small amounts.

DEALERS IN LABORATORY APPARATUS AND SUPPLIES FOR ZOOLOGY

Bausch and Lomb Optical Co., Rochester, N. Y. (microscopes and supplies); Eimer and Amend, 205-211 Third Ave., N. Y. (general apparatus, supplies and reagents); Spencer Lens Co., Buffalo, N. Y. (microscopes and supplies).

PHYSIOLOGY

A physiological laboratory for general elementary instruction gives the best results when equipped on the basis of two students to a working unit. A maximum of four students may under some condition be made the unit basis.

GENERAL EQUIPMENT

Student tables, size of top about 34 x 54, height 34 inches..	\$100.00
Stools, two to each table	
Gas, water, and electric table connections for an electric clock	
Electric clock, beating seconds, Harvard form with telegraphic relay	
Shellac outfit	
Stock of artificial physiological solutions	

GENERAL APPARATUS FOR DEMONSTRATION

1 Tyco manometer, for blood pressure	25.00
1 stethoscope, Bowles	3.50
1 Dudgeon's sphygmograph	14.00
1 mercury manometer and blood pressure outfit	5.00
1 set of test lenses for the eye	30.00
Assorted glass tubing	1.00
Assorted rubber tubing	5.00
Assorted corks	1.00

SPECIAL SETS OF APPARATUS AND CHEMICALS

(For each unit group of students)

1 recording drum, clockwork driven	24.00
1 induction coil	7.00
1 platinum stimulating electrode	1.25
2 dry batteries .....	.50
1 double spring contact key .....	.50
1 muscle lever	1.15
1 muscle clamp	1.00
100 weights, 10 gram, lead .....	.30
1 heart lever, of straw .....	.00
1 heart lever holder (use muscle lever holder) .....	.00
1 set of two heart perfusion bottles	2.00
1 signal magnet (electric, for the time circuit)	1.25
1 tuning fork, 100 double vibrations a second	1.00
2 iron stands, heavy base (chemical stands will serve)	2.00
4 burette clamps, simple .....	.60
2 burette clamps, universal .....	.80
100 sheets glazed paper, 6 x 20 inches .....	.50
1 set chemical apparatus, containing 6-inch file, 100 filter papers, 4-inch funnel, Bunsen burner, 100 cc. graduated cylinder, 2 4-inch flat bottom evaporating dishes, 300 cc.	

	flask, test tube rack and two dozen test tubes, set of 6 beakers, 100° centigrade thermometer, costing in all about	\$ 10.00
1 set	chemicals containing starch, dextrine, dextrose, acetic acid, nitric acid, hydrochloric acid, picric acid, ammonia, caustic soda or potash, sodium chloride, magnesium sulphate, ammonium sulphate, calcium chloride, copper sulphate, ammonium tartrate, glycerine, pepsin, ptylin, pancreatin and fibrin, costing in all about	6.00
1 set	chemical reagent bottles	8.00

ART

THEORY AND PRACTICE OF ART

A well-lighted room with skylight, or high windows, should be selected for the art department. The furniture is not expensive and should include individual tables, chairs or stools, and easels, with a smooth finished board for drawing and an ordinary one for modeling. The Western Stoneware Company, Monmouth, Illinois, sells modeling clay, and most of the art dealers furnish various compositions like plasticene. For the lecture purposes a good stereopticon should be furnished. Bausch and Lomb, Rochester, New York, now make at a comparatively low price a Balopticon which combines the stereopticon with an opaque projectoscope, thus enabling the instructor to use colored material. This instrument is of the highest value to the art instructor. Reproductions of the most important examples of fine arts can be purchased in the form of photographs or lantern slides, and, if a Balopticon is used, University prints, postcards, book and magazine illustrations, become very valuable lecture and study material.

It is possible for the art department to form gradually a very helpful collection of actual craft objects in pieces of pottery, textiles, etc., of good design with slight expense by watching chances to buy "seconds," yard and half yard remnants, samples, etc.

HISTORY OF MODERN PAINTING

The equipment for the courses in history of modern painting should include a good stereopticon and screen, and lantern slides, photographs, or other reproductions of paintings of each artist whose work is discussed in class.

Lantern slides may be obtained from Detroit Publishing Co., 15 W. 38th Street, New York City; Soule Art Co., 506 West Street, Roxbury, Massachusetts; and Brown, Clement & Co., 13 W. 46th Street, New York City. Photographs may be secured from the firms named above and from W. J. Gardner & Co., 498 Boylston Street, Boston,

Massachusetts; George Busse, 12 W. 28th Street, New York City; Foster Brothers, 4 Park Square, Boston, Massachusetts; A. W. Elson & Co., School Street, Belmont, Massachusetts; and Whitcombe, McGeachin & Co., 24 W. 37th Street, New York City. Excellent and inexpensive half tones (about one cent each) may be had from Cosmos Pictures Co., 119 W. 25th Street, New York City; the Perry Pictures Co., Malden, Massachusetts; and especially from University Prints, Newton, Massachusetts. Catalogs and prices may be obtained by writing to any of these firms.

HOME ECONOMICS

Every department of home economics should have well-equipped laboratories for food and for clothing work. Their size should depend, of course, upon the number of students to be accommodated. If a chemistry laboratory is not available, the food laboratory should be equipped for the necessary chemistry work. Since the influence of suggestion is strong, the laboratories should be arranged as attractively and as efficiently as possible.

FOOD LABORATORY

The food laboratory should be provided with individual equipment and sufficient general equipment, as stoves, sinks, etc., to make efficient work possible. The individual equipment costs approximately \$4.10 per student. Adequate general equipment may be purchased for approximately \$425. This includes all the equipment indicated below.

Laboratory desks in the food laboratory can be made locally or can be purchased from any of the houses supplying laboratory equipment. They vary in price, ranging from \$10 up for the unit accommodating two students, the price depending upon the kind and quality of the material, the method of construction, the finish of the top of the desk, and whether or not individual gas plates are attached.

The individual stoves may be purchased separately at from \$2.50 to \$3.50 each. The shelf type is preferable, because it takes up less space on the table top. The stoves without a solid top waste less heat by radiation.

The tops of the desks should be of impervious material not easily stained. Well-fitted hard wood, stone, tile, and various forms of composition are the types of tops most frequently used. It is a matter of economy to buy good laboratory desks.

There should be sufficient oven space for the work of each pupil. Individual ovens may be used over the individual gas burners, but since many of these are not satisfactory, they should be carefully tested before being purchased. In some laboratories such ovens are

arranged on shelves in one corner over stationary gas burners. Another alternative is to have a sufficient number of large stoves to provide oven room. A fireless cooker is desirable.

Unless the school refrigerator is available for the use of the department of home economics, a refrigerator of the household size should be provided.

There should be a storage cabinet for food materials. This should have either crockery or glass jars in which food can be kept. Nothing detracts so much from the good appearance of or the good results in a food laboratory as poor storage facilities.

Each food laboratory should have a scale of the balance type for each six students, and at least one thermometer for each two students. Chemical thermometers graduated to 250° C are the best. Microscopes should be available when needed, at least in the proportion of one to each four students. These should be equipped with sufficient slides and cover glasses.

If a chemical laboratory is available, the students can do the necessary chemical work there. It is better, however, to have a shelf along one side of the food laboratory on which the chemical work may be done. In this case, the following equipment should be provided for each two students.

- 1 Bunsen burner
- 1 25 cc. graduate cylinder
- 12 test tubes
- 1 test tube holder
- 1 test tube rack
- 4 beakers, 100 to 250 cc.
- 1 2½ inch funnel
- 1 wooden funnel holder
- 1 vial litmus paper
- 1 pkg. qualitative filter paper

The following general equipment is desirable:

- 4 burettes, 50 cc.
- 1 Babcock tester for fat
- 4 egg candlers

Unless an individual kitchen is provided, one corner of the laboratory should be fitted up as a kitchen unit. If this is placed on the side of the dining room or of the room used for the service of meals, and if care is taken in fitting it up properly, it can be made almost as satisfactory as an individual kitchen. Meal preparation work in the large laboratory is liable to develop bad habits of work in the students and is less efficient on account of the size of the laboratory. The kitchen unit approaches more nearly the home conditions under which the girls will ordinarily have to work.

The following list of equipment is intended to be suggestive. The prices quoted are only approximate. In the case of such things as desks, refrigerator, supply cabinet and cupboards, cheaper equipment may be secured, if necessary. Detailed information with regard to equipment may be found in *Equipment for Teaching Domestic Science* by Helen Kinne. Whitcomb & Barrows, Huntington Chambers, Boston, Mass. The price of this book is eighty cents.

1 gas range	\$ 21.00
1 stove, with oven (if there is no gas)	10.00
8 desks, each 5 ft. long, each	25.00
16 stools, each .....	.75
1 sink	4.00
1 refrigerator	25.00
1 supply cabinet	10.00
1 grocery cupboard	5.00
1 china cupboard	10.00
1 set scales (Balance, not spring)	3.00
Microscopes	20.00
8 dishpans, each .....	.25
8 tin boxes for flour, each .....	.08
8 tin boxes for sugar, each .....	.08
8 plates for soap and sapolio, each .....	.05
8 thermometers, each .....	.30
4 shallow biscuit pans, made to fit the oven .....	.40
8 biscuit cutters, each .....	.05
1 roasting pan .....	.25
2 deep iron kettles .....	.75
2 wire baskets, each .....	.10
2 draining spoons .....	.06
1 large grater .....	.05
2 large stew kettles, each .....	.50
2 large double boilers, each .....	.25
4 ice cream freezers, 1 qt.	5.00
2 doz. fruit jars	1.50
2 doz. jelly glasses	2.00
8 muffin rings	2.00
1 meat grinder	1.25
1 coffee pot (percolator)	3.50
1 flour sifter .....	.10
1 tea kettle .....	.75
6 small tin buckets .....	.30
1 large sauce pan .....	.25
1 carving knife .....	.25

1 tea pot	\$.25
2 scrubbing brushes, each . . . . .	.15
40 dish cloths, linen, $\frac{1}{4}$ yard in length	2.00
50 dish towels, linen, 1 yard in length	7.50
16 sets of apparatus, as follows	
1 tablespoon . . . . .	.06 $\frac{2}{3}$
2 teaspoons, each . . . . .	.03 $\frac{1}{3}$
1 salt spoon . . . . .	.05
1 wooden spoon . . . . .	.05
1 fork . . . . .	.07
1 spatula . . . . .	.25
1 paring knife . . . . .	.05
1 measuring cup . . . . .	.08
1 mixing bowl . . . . .	.50
1 large baking dish . . . . .	.35
1 ramekin . . . . .	.10
1 plate, (porcelain) . . . . .	.10
1 pie tin . . . . .	.03
1 clover egg beater . . . . .	.10
1 egg whip . . . . .	.02
1 rolling pin . . . . .	.30
1 molding board . . . . .	.10
1 deep cake and bread pan . . . . .	.10
2 sauce pans, each . . . . .	.25
1 cover for sauce pans . . . . .	.05
1 frying pan . . . . .	.08
1 wire strainer . . . . .	.10
1 double boiler . . . . .	.25

There should be an equipment for the service of meals. Preferably this should be a separate dining room provided for this purpose. If this is impossible, one part of the food laboratory should be used for the service of meals, the proper equipment being provided. Dining room equipment should include table, linen, china, and silver, unless these can be obtained from the college dining room.

CLOTHING LABORATORY

The clothing laboratory should contain tables one yard in width and in sufficient length and number to allow at least two and one-half feet of space for each student. The tables for the clothing laboratory can be purchased from any furniture house. Three by eight feet or three by ten feet are satisfactory dimensions for the tables.

Each student should have the following individual equipment:

- 1 yd. ruler, metal edged

- 1 pair 6 inch scissors
- 1 tape line
- 1 pin cushion
- 1 emery
- 1 work box

These articles may be provided by the school or may be purchased by the students. For each pupil a box should be provided of sufficient size to hold the individual equipment and the material used. Unless there are lockers in which the boxes may be placed, it is well to have tin boxes fitted with lock and key.

There should be one sewing machine to each five students. A new electric machine is now on the market for about the same cost as other machines. It is very compact, the bottom portion being omitted, and it is especially desirable.

A good ironing board and an iron (preferable electric) should be provided.

There should be at least four tracing wheels for each class.

Cabinets should be provided to hold the students' work, one of which must be of sufficient height to allow for the hanging of dresses in the process of construction. These cabinets should be equipped with coat hangers.

The chemical laboratory should be available for the clothing classes as well as for the food classes.

The following list of chemical equipment should be available to each student in the clothing work:

- 12 test tubes
- 3 beakers, nested, 50 to 250 cc.
- 1 50 cc. graduated cylinder
- 3 stirring rods
- 3 watch glasses
- 3 small evaporating dishes
- 1 box litmus paper
- 1 Bunsen burner
- 1 pair crucible tongs
- 1 tripod

In addition to this individual equipment, one Burette with an iron stand should be available to each four students. The chemicals can probably be secured as needed from the department of chemistry. There should be one microscope for each four students.

PHYSICAL TRAINING

GYMNASIUM EQUIPMENT

24 pair Indian clubs, 1-lb.	\$ 12.00
Hangers for clubs	2.40
24 pair wooden wands, 36 in.	2.40
Wand rack	2.00
1 pair jump standards	7.50
3 to 6 mats, 2 in. thick, assorted sizes, (3 x 5, 5 x 5, 4 x 6)	\$50.00 to 100.00
6 stall bars @ 7	42.00
Climbing rope	8.00
Beat board	6.00
Vertical ladder	36.00
Vaulting box	40.00
Spring board	24.00
Dozen bean bags	4.00
Playground ball equipment, per year	5.00
Basketball equipment, per year	12.00
Volley ball equipment, per year	4.00
Three to six showers. Costs depends on local conditions.	
Lockers, per unit	\$3.00 to 4.50
Institutions with dormitories can well do without lockers by providing a system of individual dressing booths adjacent to showers.	

FIELD EQUIPMENT

Basketball court	
Tether tennis	
Tennis	
Soccer ball	\$ 5.00
Space for hockey, relays, track athletics, soccer and group games	
Two dozen hockey sticks .....	.50
Two or three hockey balls, each	1.00

DEALERS IN GYMNASIUM AND ATHLETIC EQUIPMENT

Medart Manufacturing Co., DeKalb Street, St. Louis, Missouri; Narragansett Machine Co., Providence, Rhode Island; Schmeltzer Arms Co., Kansas City, Mo.; A. G. Spalding and Brothers, Chicopee, Massachusetts (branch house, 415 North 7th Street, St. Louis, Missouri).

When buying in quantities, institutions should secure considerable reduction from list prices given above.

III

SUGGESTIONS FOR THE EQUIPMENT OF LIBRARIES

GENERAL INFORMATION

A separate room should be set apart for the library. This room should be well lighted, well ventilated, and commodious, and should be equipped with book stacks, reading tables, librarian's desk, filing cases for the catalog, and the like. The library should be open all day and should be in charge of a competent librarian. It is as important that the librarian have special training in preparation for his work as it is important that the teacher have professional training.

In order that reference work may be done with efficiency and dispatch, the library should contain all the books listed in this bulletin under "General Reference Books." The books listed in this bulletin under "Bibliography" are especially helpful to librarians in classifying, cataloging, and administering the library.

The lists of books which follow are not intended to indicate a well proportioned library. They are reference lists for the junior college courses outlined in this bulletin. The relative importance of books is indicated in a number of the lists by the use of asterisks. Books considered essential are double starred, thus **; books considered next in importance are single starred, thus *.

It is more economical for a college to purchase books for its library thru a local book store or thru some dealer who makes a specialty of supplying books to libraries than it is to purchase books directly from the publishers. The Missouri Stores Company†, of Columbia, Missouri, and A. C. McClurg and Company, of Chicago, Illinois, are among the dealers who make a specialty of supplying books to libraries. Books not published in the United States may be imported thru such firms as G. E. Stechert Company, 151 West 25th Street, New York, and Lemcke and Buechner, 30 West 27th Street, New York.

† The Missouri Stores Company has a contract with the State Department of Education to supply books at special prices to school libraries in Missouri. This Company will make special district prices in the case of junior colleges when books are purchased for library or classroom purposes. These district prices are f. o. b. Columbia with the provision that in the case of any junior college situated in Missouri, the Missouri Stores Company will prepay freight charges to the freight station nearest the college on all orders amounting to not less than \$25.00.

PUBLISHERS

In the book lists given in this bulletin the names of publishing firms are abbreviated. The full names and addresses of these firms are as follows:

- Allyn—Allyn & Bacon, 1006 S. Mich. Ave., Chicago.
 American—American Book Co., 330 E. 22nd St., Chicago.
 American Acad.—American Academy of Political and Social Science, Station B, Phila.
 Appleton—D. Appleton & Co., 533 S. Wabash Ave., Chicago.
 Atkinson—Atkinson, Mentzer & Co., 318 W. Washington St., Chicago.
 Badger—R. G. Badger, 194 Boylston St., Boston.
 Bardeen—C. W. Bardeen, 317 E. Washington St., Syracuse, N. Y.
 Bell—George Bell & Sons, London.
 Blakiston—P. Blakiston's Son & Co., 1012 Walnut St., Phila.
 Bobbs—Bobbs-Merrill Co., Indianapolis, Ind.
 Brentano's—Brentano's, 5th Ave. and 27th St., N. Y.
 Cambridge U. Press—Cambridge Univ. Press, Cambridge, England.
 Cassell—Cassell & Co., London.
 Century—Century Co., 353 4th Ave., N. Y.
 Clarendon Press, Cambridge, England.
 Comstock—Wm. T. Comstock Co., 23 Warren St., N. Y.
 Ditson—Oliver Ditson, 150 Tremont St., Boston.
 Dodd—Dodd, Mead & Co., Kansas City & New York.
 Doubleday—Doubleday, Page & Co., Garden City, N. Y.
 Dutton—E. P. Dutton & Co., 681 Fifth Ave., N. Y.
 Ginn—Ginn & Co., 2301 Prairie Ave., Chicago, Ill.
 Gorham—E. S. Gorham, 7 W. 45th St., N. Y.
 Harper—Harper & Bros., Franklin Square, N. Y.
 Heath—D. C. Heath & Co., 623 S. Wabash Ave., Chicago.
 Herder—B. Herder, 17 S. Broadway, St. Louis.
 Holt—Henry Holt & Co., 34 W. 33rd St., N. Y.
 Houghton—Houghton, Mifflin & Co., 623 S. Wabash Ave., Chicago.
 Huebsch—B. W. Huebsch, 225 5th Ave., N. Y.
 J. H. Press—Johns Hopkins Press, Baltimore, Md.
 Judd—Orange Judd Co., 315 4th Ave., N. Y.
 Lea—Lea & Febiger, 706 Sansom St., Phila.
 Lemcke—Lemcke & Buechner, 30 W. 27th St., N. Y.
 Lippincott—J. B. Lippincott & Co., Washington Sq., Phila.
 Little—Little, Brown & Co., 34 Beacon St., Boston.
 Longmans—Longmans, Green & Co., 443 4th Ave., N. Y.
 McClure—Publications handled by Doubleday.
 McClurg—A. C. McClurg & Co., 330 E. Ohio St., Chicago.
 McGraw—McGraw-Hill Book Co., 239 W. 39th St., N. Y.

Macmillan—The Macmillan Co., Prairie Ave. and 25th St. Chicago.
 Merriam—C. & G. Merriam, Springfield, Mass.
 Merrill—Chas. E. Merrill Co., 432 4th Ave., N. Y.
 Millet—J. B. Millet Co., 120 Boylston St., Boston.
 Moffat—Moffat Yard & Co., 116 W. 32nd St., N. Y.
 Novello—Novello & Co., 2 W. 45th St., N. Y.
 Nystrom—A. J. Nystrom & Co., Chicago.
 Open Court—Open Court Pub. Co., 122 S. Mich. Ave., Chicago.
 Oxford—Oxford University Press, 35 W. 32nd St., N. Y.
 Page—Page Co., 53 Beacon St., Boston.
 Paul—Kegan, Paul, Trench, Trubner & Co., London.
 Peck—G.. Peck, 117 Chambers St., N. Y.
 Pott—James Pott & Co., 214 E. 23rd St., N. Y.
 Putnam—G. P. Putnam & Sons, 2 W. 45th St., N. Y.
 Rand—Rand McNally & Co., Chicago.
 Routledge—George Routledge & Sons, London.
 Row—Row, Peterson & Co., 623 S. Wabash Ave., Chicago.
 Sanborn—B. H. Sanborn & Co., 623 S. Wabash Ave., Chicago.
 Saunders—W. B. Saunders Co., Washington Sq., Phila.
 Scott—Scott, Foresman & Co., 623 S. Wabash Ave., Chicago.
 Scribner—Chas. Scribner's Sons, 608 S. Dearborn St., Chicago.
 Schirmer—G. Schirmer, 3 E. 43rd St., N. Y.
 Seeley—Seeley, Service & Co., London.
 Seiler—A. G. Seiler, 1224 Amsterdam Ave., N. Y.
 Simmons—Parker B. Simmons Co., 3 E. 14th St. N. Y.
 Silver—Silver Burdett & Co., 218 Columbus Ave., Chicago.
 S. P. C. K.—Society for Promoting Christian Knowledge, London.
 Stokes—F. A. Stokes & Co., 443 4th Ave., N. Y.
 Stechert—G. E. Stechert & Co., 151-155 W. 25th St., N. Y.
 Teachers College—Teachers College, Columbia Univ., N. Y.
 Van Nostrand—D. Van Nostrand Co., 25 Park Place, N. Y.
 Warwick—Warwick & York, 19 W. Saratoga St., Baltimore, Md.
 Whitcomb—Whitcomb & Barrows, Boston.
 Wiley—John Wiley & Sons, 432 4th Ave., N. Y.
 Wilson—H. W. Wilson Co., 958 University Ave., N. Y.
 Wood—William Wood & Co., 51 5th Ave., N. Y.
 Yale U. Press—Yale Univ. Press, New Haven, Conn.

GENERAL REFERENCE BOOKS

ART

American Art Annual. Amer. Federation of Arts, 1741 N. Y.
 Ave., Washington, D. C.\$ 5.00
Champlain, J. D., and Perkins, C. G., Cyclopaedia of Painters and
Painting, 4 Vols., Scribner 20.00

Clement, C. E., <i>Handbook of Legendary and Mythological Art</i> , Houghton	\$ 3.00
Reinach, S., <i>Apollo</i> (an illustrated manual of the history of art throughout the ages), new Ed., Scribner	1.50
Sturgis, Russell and others, <i>Dictionary of Architecture and Build- ing</i> (biographical, historical, and descriptive), 3 Vols., Mac- millan	18.00

ATLASES

Bartholomew, J. G., <i>Literary and Historical Atlas of Europe</i> , Everyman, Dutton . . . . .	.50
Bartholomew, J. G., <i>Literary and Historical Atlas of America</i> , Everyman, Dutton . . . . .	.50
Dow, E. W., <i>Atlas of European History</i> , Holt	1.50
Gardiner, S. R., <i>Atlas of English History</i> , Longmans	1.50
Kiepert, H., <i>Atlas Antiquus</i> , Stechert	1.75
Kiepert, H., and Huelson, C., <i>Forma Urbis Romae Antiquae</i> , Stechert	1.00
Labberton, R. H., <i>Historical Atlas</i> (3800 B. C. to 1900 A. D.), Silver	1.25
Putzger, F. W., <i>Historical School Atlas of Ancient, Mediaeval, and Modern History</i> , Lemcke	1.25
Rand McNally, <i>Unrivalled Atlas</i> , Rand	7.00
Rand McNally, <i>Library Atlas of the World</i> , 2 Vols., Rand	25.00
Schreiber, Th., <i>Atlas of Classical Antiquities</i> , Macmillan	6.00
Schreiber, Th., <i>Atlas of Ancient Classical Geography</i> , Everyman, Dutton . . . . .	.50

BIBLIOGRAPHY AND LIBRARY SCIENCE

<i>Abridged Decimal Classification and Relative Index Revised</i> , Li- brary Bureau, Chicago	1.50
A. L. A. <i>Booklist</i> , (Monthly) American Library Association, Chi- cago, Ill.	1.00
A. L. A. <i>Catalog of 8000 Volumes For a Popular Library</i> (well selected and classified), 1904, Washington, Superintendent of Documents	1.00
A. L. A. <i>Catalog Supplement</i> , 1904-1911, Chicago, American Li- brary Association	1.50
A. L. A. <i>List of Subject Headings</i> , Chicago, American Library Association	2.50
<i>Cumulative Book Index</i> , (monthly, with quarterly and yearly cumulations), H. W. Wilson Co., N. Y. Price on application.	
Fay, L. E., and Eaton, Anne T., <i>Instruction in the Use of Books and Libraries</i> , The Boston Book Co., Boston	2.25

Severance, H. O., <i>Library Primer</i> , The Missouri Book Co., Columbia, Mo.	\$ 1.25
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BIOGRAPHY

<i>Century Cyclopaedia of Names</i> , (Vol. 11 of <i>Century Dictionary</i> .)	
<i>Lippincott's Biographical Dictionary</i> , new Edition. Ed. by Heilprin, Lippincott	8.00
<i>Who's Who in America</i> , (biennial), A. N. Marquis, 440 S. Dearborn St., Chicago	5.00

DEBATING

Craig, Asa H., <i>Pros and Cons</i> , (complete debates with questions fully discussed on both sides) Hinds	1.50
Phelps, Edith M., <i>Debaters' Manual</i> , H. W. Wilson Co., N. Y.	1.00
Debaters handbook series, \$1.00 each. These handbooks, of which twenty-seven have been published, furnish bibliographies on all questions treated and give selections from magazines and from other material on various questions such as woman suffrage, municipal ownership, and the like. The H. W. Wilson Company, who publish the handbooks, loan articles printed in magazines, whether singly or collectively, at a nominal price. A library that wishes to borrow several articles on any debate question can get them from this firm.	

DICTIONARIES

English

<i>Century Dictionary and Encyclopaedia</i> , revised, 1911, (may be secured from dealers now for about \$30.00 in buckram binding), Century	\$ 75.00
Skeat, W. W., <i>Etymological Dictionary of the English Language</i> , 1910, Oxford	11.75
<i>Webster's New International Dictionary</i> , revised, 1913, Merriam..	12.00

French

Edgren, N., and Burnet, P. B., <i>French and English Dictionary</i> , Holt	1.50
<i>International French and English Dictionary</i> , Hinds	3.00

German

Flugel, <i>Worterbuch</i> , 2 Vols., Stechert	4.00
Heath, D. C., <i>German and English Dictionary</i> , Heath	1.50
James, W., <i>German and English Dictionary</i> , Macmillan	1.00
Kluge, <i>Etymologische Handwörterbuch</i> , Ed. 8, Stechert	2.80

Greek

Liddell, H. G., and Scott, R., <i>Greek-English Lexicon</i> , American..	\$ 10.00
Liddell, H. G., and Scott, R., <i>Greek-English Lexicon</i> , Intermediate Ed., American	3.52

Italian

Milhouse, J., <i>Italian English Dictionary</i> , 2 Vols., Ed., 5, Appleton.	5.50
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Latin

Lewis, C. I., and Short, C., <i>Harper's Latin Dictionary</i> , American.	6.00
Smith, W., and Hall, T. D., <i>English-Latin Dictionary</i> , American.	4.00

Spanish

Velasquez, M., <i>New Spanish and English Dictionary</i> , Appleton..	1.00
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CLASSICAL ANTIQUITIES

Ramsay, W., <i>Manual of Roman Antiquities</i> , Scribner	3.00
Schreiber, Th., <i>Smaller Classical Dictionary</i> , Everyman, Dutton.	.50
Smith, W., <i>Dictionary of Greek and Roman Antiquities</i> (including the laws, domestic usages, painting, sculpture, music, drama, etc.), American	4.25
Walter, H. B., <i>Classical Dictionary of Greek and Roman Antiquities</i> (biography, geography and mythology), 1916, Cambridge University Press	6.50

EDUCATION

Monroe, P., <i>Cyclopaedia of Education</i> , 5 Vols., Macmillan.....	25.00
United States Commissioner of Education, <i>Reports and Bulletins</i> .	

ENCYCLOPAEDIAS

<i>Encyclopaedia Britannica</i> , 29 Vols., Ed. 11, 1910, Cambridge University Press	135.00
<i>New International Encyclopaedia</i> , 24 Vols., Ed. 2, 1914-16, Dodd..	120.00
<i>New International Yearbook</i> (published annually), Dodd	5.00

FOLKLORE

Dasent, G. W., <i>Popular Tales from the Norse</i> , Putnam	2.50
Grimm, W., <i>Fairy Tales</i> , Everyman, Dutton .....	.50
<i>Mabinogion</i> , Tr. by Lady Guest, Everyman, Dutton .....	.50
Perrault, C., <i>Fairy Tales</i> , Estes	1.50

GAZETTEERS AND GEOGRAPHY

<i>Lippincott's New Gazetteer</i> , Lippincott	\$ 10.00
Mill, H. R., <i>International Geography</i> ; by 20 Authors, Ed. 3, 1909 Appleton	3.50

HISTORY

Brewer, E. C., <i>Historic Note Book</i> , latest Ed., Lippincott	3.50
<i>Harper's Encyclopaedia of U. S. History</i> , 10 Vols., second hand about	10.00
Haydn, J. T., <i>Dictionary of Dates and Universal Information Relating to All Ages and Nations</i> , Ed. 25, 1911, Putnam.....	6.50

INDEXES TO PERIODICALS

A. L. A. <i>Index to General Literature</i> , 1911, Chicago, American Library Association	6.00
Supplement, 1914	4.00
<i>Guide to Current Periodicals and Serials of the United States and Canada</i> , 1914, Ann Arbor, Mich., George Wahr	2.50
<i>Industrial Arts Index</i> , White Plains, N. Y., H. W. Wilson Co. (Price depends upon the number of magazines indexed, which are received by the subscribing library.)	
<i>Poole's Index</i> , not abridged, 6 Vols., Boston, Houghton.....	62.00
<i>Poole's Index to Periodical Literature</i> , abridged, Houghton	12.00
<i>Readers' Guide to Periodical Literature</i> , White Plains, N. Y., the H. W. Wilson Co. (This work is published monthly with monthly, quarterly, and yearly cumulations at \$12.00 a year. The quarterly numbers may be furnished to libraries which receive currently not more than twenty periodicals indexed in the <i>Guide</i> for \$4.00 a year. The <i>Annual Eclectic Catalog</i> which preceded the quarterly cumulations of the <i>Guide</i> can be purchased from the H. W. Wilson Co., for \$3.50.)	
<i>Readers' Guide Supplement</i> , White Plains, N. Y., H. W. Wilson Co.	

LITERATURE

Adams, O. F., <i>Dictionary of American Authors</i> , Houghton	3.00
Allibone, S. A., <i>Critical Dictionary of English Literature and of British and American Authors</i> , with supplement by J. F. Kirk, 5 Vols., Lippincott	17.50
Baker, E. A., <i>Guide to Historical Fiction</i> , 1914, Macmillan	6.00
Brewer, E. C., <i>Dictionary of Phrase and Fable</i> , New Ed., Phila. Lippincott	3.50
Brewer, E. C., <i>Reader's Handbook of Allusions, References, Plots and Other Stories</i> , Revised Ed., 1898, Lippincott	2.00

Bryant, Willam C., <i>New Library of Poetry and Song</i> , New York, Baker & Taylor	\$ 5.00
<i>Chambers' Cyclopaedia of English Literature</i> , 3 Vols., new Ed. by D. Patrick, 1902-04, Lippincott	12.00
Crabbe, G., <i>English Synonyms Explained in Alphabetical Order</i> , 1892, Harper	1.25
Fernald, J. C., <i>English Synonyms and Antonyms, with Notes on the Correct Use of Prepositions</i> , 1896, Funk	1.50
Gayley, C. M., <i>Classic Myths in English Literature</i> , revised Ed., 1911, Ginn	1.50
Granger, E., <i>Index to Poetry and Recitations</i> , 1904, McClurg.....	5.00
Moulton, C. W., <i>Library of Literary Criticism of English and American Authors</i> , 8 Vols., 1901-09, Malkan	40.00
Palgrave, F. T., <i>Golden Treasury; Selected from the Best Songs and Lyrical Poems in the English Language</i> , new Ed., Macmillan	1.00
Reddall, H. F., <i>Fact Fancy and Fable</i> (a new handbook for ready reference on subjects commonly omitted from cyclopaedias), 1899, McClurg	1.50
Roget, P. M., <i>Thesaurus of English Words and Phrases</i> (classified and arranged so as to facilitate the expression of ideas and assist in literary compositions), new Ed., 1909, Longmans	1.60
Pylands, T., <i>Chronological Outlines of English Literature</i> , Macmillan	2.00
Stedman, E. C., <i>American Anthology</i> , 1787-1899, 1900, Houghton	2.00
Stedman, Edmund C., and Hutchinson, E. M., <i>Library of American Literature</i> , 11 Vols., N. Y., Charles L. Webster & Co.....	33.00
Stedman, E. C., <i>Victorian Anthology</i> , Houghton	3.00
Ward, T. H., <i>English Poets</i> , 4 Vols., (Student's Edition), Macmillan	4.00
Warner, Charles D., <i>Library of the World's Best Literature, Ancient and Modern</i> , 31 Vols., N. Y. Warner Library Co.	77.50
(Can be purchased second hand for about \$30.00)	

MUSIC

Annesley, C., <i>Standard Opera Glass</i> (detailed plots of 155 celebrated operas) new Ed., Brentano's	1.50
Baker, T., <i>A Dictionary of Musical Terms</i> , Ed. 12, Schirmer ..	1.00
Grove, G., <i>Dictionary of Music and Musicians</i> , revised Ed., 5 Vols. 1904-10, Macmillan	25.00
Upton, G. P., <i>Standard Oratorios</i> , Ed. 2, McClurg	1.50

POLITICAL SCIENCE

Hart, A. B., and McLaughlin, A. C., <i>Cyclopaedia of American Government</i> , 3 Vols., 1913, Appleton	\$ 22.50
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RELIGION

Bible, Holy Bible, American Revision, 1881-1885, Nelson75
<i>Modern Reader's Bible</i> , Ed. by Moulton, Macmillan	2.00
Dummelow, J. R., <i>Commentary on the Holy Bible by Various Writers</i> , Macmillan	2.50
Fallows, S., and others, <i>Popular and Critical Bible Encyclopaedia and Scriptural Dictionary</i> , 3 Vols., Howard-Severance	14.00
Hastings, J., <i>Dictionary of the Bible</i> , Scribner	5.00

SCIENCE

Hopkins, A. A., <i>Scientific American Cyclopaedia of Formulas</i> , Munn.	5.00
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SOCIOLOGY

Bliss, <i>New Encyclopaedia of Social Reform</i> , N. Y., Funk, Wagnall	7.50
<i>Check List of U. S. Government Documents</i> , 1789-1909, Sup't. of Documents	free
Deems, E. S., <i>Holy Days and Holidays</i> , 1902, Funk	5.00
Everhart, E., <i>Handbook of U. S. Public Documents</i> , 1910, H. W. Wilson Co.	2.50
Green, W. C., <i>Dictionary of Etiquette</i> , 1904, Brentano's	1.25
<i>Guide to Reading in Social Ethics and Allied Subjects</i> , Cambridge, Mass., Harvard University	1.25
<i>Missouri Blue Book</i> , published annually by the Secretary of State	free
<i>Missouri Red Book</i> , published annually by the Bureau of Labor Statistics	free
<i>U. S. Statistical Abstract</i> , Census Bureau, Washington, D. C.	free
<i>U. S. Congress, Official Congressional Directory</i>	free
Walsh, W. S., <i>Curiosities of Popular Customs and Rites, Ceremonies, Observances, and Miscellaneous Antiquities</i> , Lippincott	3.50
<i>World Almanac</i> , Annual, The World, New York, (in cloth binding) .....	.60
Wyer, J. J., Jr., <i>U. S. Government Documents in Small Libraries</i> , Chicago, American Library Association .....	.15

ENGLISH LANGUAGE AND LITERATURE

LANGUAGE

Abbott, E. A., <i>Shakesperian Grammar</i> , Macmillan	\$ 2.00
Alden, R. M., <i>English Verse</i> , Holt	1.25
Bradley, H., <i>Making of English</i> , Macmillan	1.10
Bright and Miller, <i>Elements of English Versification</i> , Ginn ....	.80
**Fowler, N. W., and F. G., <i>King's English</i> , Oxford Univ. Press	1.75
**Genung, J. F., <i>Working Principles of Rhetoric</i> , Ginn	1.40
*Greenough, T. B., and Kittredge, G. L., <i>Words and Their Ways</i> in <i>English Speech</i> , 1901, Macmillan	1.10
*Hill, A. S., <i>Principles of Rhetoric</i> , new Ed., American	1.20
Jespersen, O., <i>Growth and Structure of the English Language</i> , N. Y., 1905, Stechert	1.00
Jespersen, O., <i>Progress in Language</i> , 1904, Macmillan	1.90
*Jones, D., <i>Pronunciation of English</i> , Putnam .....	.90
*Krapp, G. F., <i>Modern English</i> , 1909, Scribner	1.25
Linn, J. W., <i>Essentials of English Composition</i> , Scribner	1.00
Lounsberry, T. W., <i>Standard of Pronunciation in English</i> , Harper	1.50
*Nesfield, J. C., <i>English Grammar Past and Present</i> , Macmillan..	1.50
*Rippman, W., <i>Sounds of Spoken English</i> , 1914, Dutton .....	.35
Rippman, W., <i>Specimens of English</i> (spoken, read and recited). 1914, Dutton .....	.35
Smith, L. P., <i>English Language</i> , Holt .....	.50
Weekley, E., <i>Romance of Words</i> , 1912, Dutton	1.25
Whitney, W. D., <i>Essentials of English Grammar</i> , Ginn .....	.75
Wyld, H. C., <i>Growth of English</i> , Dutton	1.00
Wyld, H. C., <i>Historical Study of the Mother Tongue</i> , Dutton	2.00
Wyld, H. C. <i>Short History of English</i> (with a bibliography of recent books on this subject), 1915, Dutton	2.25

ENGLISH LITERATURE

History and Criticism

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Racine, Jean, <i>Théâtre complet</i> , Paris, Didot & Cie	1.00
Ronsard, Pierre de, <i>Lyriques</i> , Stokes25
Rostand, Edmond, <i>Cyrano de Bergerac</i> , Paris, Fasquelle	1.00
Rostand, Edmond, <i>L'aiglon</i> , Paris, Fasquelle	1.00
Rostand, Edmond, <i>Chantecler</i> , Paris, Fasquelle	1.00
Rostand, Edmond, <i>Les romanesques</i> , Paris, Fasquelle	1.00

Rousseau, Jean Jacques, <i>Emile</i> , Tr. by H. Payne, Appleton.....	\$ 1.50
Saintine, Joseph Xavier, <i>Picciola</i> , Paris, Hachette .....	.50
Sand, George, <i>La mare au diable</i> , Paris, Calmann-Levy	1.00
Sand, George, <i>La petite Fadette</i> , Paris, Calmann-Levy.....	1.00
Sardou, Victorien, <i>La perle noire</i> , Paris, Calmann-Levy.....	.50
Sardou, Victorien, <i>Les pattes de mouche</i> , Comedie in trois acts, Heath's modern language series, Heath .....	.40
Souvestre, Émile, <i>Un philosophe sous les toits</i> , Paris, Calmann- Levy .....	.50
Souvestre, Émile, <i>Les derniers Bretons</i> , Paris, Calmann-Levy....	.50
Theuriet, Claude, Adhémar André, <i>Le mariage de Gerard</i> , Ed. by R. E. Bassett, Jenkins .....	.85
Viaud, Julien, (Pierre Loti, pseud.) <i>Pêcheur d'islande</i> , Paris, Calmann-Levy	1.00
Voltaire, François Marie Arouet de, <i>Toleration and Other Essays</i> , Tr. with an introduction by Jos. McCabe, Putnam	1.25
Zola, Émile, <i>La débâcle</i> , Paris, Fasquelle	1.00
Zola, Émile, <i>Le travail</i> , Paris, Fasquelle	1.00
*Fortier, A., <i>Hist. de la littérature française</i> , Holt	1.00
Konta, Annie Lemp, <i>The History of French Literature from the Oath of Strasburg to Chanticleer</i> , 1914, Appleton	2.50
*Lanson, G., <i>Hist. de la lit. française</i> , Paris, Hachette	1.40
<i>L'opinion</i> , <i>Journal de la semaine</i> , Paris	6.00
*Pellissier, G., <i>Précis de l'histoire de la lit. française</i> , Paris....	.80
Saintsbury, George Edward Bateman, <i>Short History of French Literature</i> , Ed. 6, Oxford Univ. Press	2.60
Thieme, Hugo Paul, <i>Guide bibliographique de la littérature fran- çaise, de 1800 a 1906</i> , Paris, Welter	4.50

PHONOGRAPHS

One of the most desirable aids to a correct pronunciation is the phonograph. A teacher can not possibly give all the time necessary to secure good pronunciation in an average class, but this machine proves an admirable substitute, when conscientiously and continuously used. Good companies that sell or lease phonographs and the necessary disks for the study of a modern language are The United States School of Languages, Annapolis, Md., and the International College of Languages, Putnam Building, New York. A machine with a set of elementary disks and the corresponding text can be bought for about \$45. The set of advanced records costs \$10, and a third set of difficult French words costs \$5. The same School has sets of records for Spanish.

SPANISH LANGUAGE AND LITERATURE

Latin-American books are indicated by the Letter <i>L-A</i> in italics.	
Braus, <i>Historia de Puerto Rico</i> , 1904, Appleton, <i>L-A</i>	\$ 1.00
Canepa, <i>Historia Argentina</i> , <i>L-A</i>	
** <i>Catalogue raisonné of Spanish Literature</i> (invaluable as a guide in selecting Spanish books and periodicals), Lemcke & Buechner.	
Cervantes, <i>Don Quixote</i> , Tr. by Motteux, 2 Vols., Macmillan	2.00
*Clemenceau, G., <i>Notas de Viaje</i> , <i>L-A</i> , 1911, Buenos Aires	
**Coester, <i>The Literary History of Spanish America</i> , Macmillan, <i>L-A</i>	2.50
Darfo, Rubén, <i>Prosas profanas</i> , <i>L-A</i> .	
* <i>Diccionario de la Real Academia</i> , Hernando, Madrid.	
Espora, <i>Episodios nacionales</i> , <i>L-A</i> .	
**Fitzmaurice-Kelly, J. A., <i>History of Spanish Literature</i> , Appleton	1.50
Galván, M., <i>Enriquillo</i> , <i>L-A</i>	1.00
**Goldsmith, P. H., <i>A Brief Bibliography of Books Relating to Latin-America</i> , Macmillan, <i>L-A</i> .....	.50
González, Peña, <i>La Chiquilla</i> , <i>L-A</i> .....	.35
** <i>Gramática de la Real Academia</i> , Madrid.	
*Guerrini, <i>El Ciudadano argentino</i> , <i>L-A</i> .	
Gutiérrez Nájera, <i>Hojas sueltas</i> , <i>L-A</i> .....	.75
*Hanssler, <i>Bibliographical Guide to Spanish Language and Literature</i> , Witter, St. Louis.	
Hernández Cata, <i>La Juventud de Aurelio Zaldívar</i> , <i>L-A</i> .....	.90
**Hume, M. A. S., <i>Spanish Influence on English Literature</i> , Lip-pincott	2.00
**Isaacs, J., <i>Mariá</i> , <i>L-A</i> .....	.60
López, <i>La Gran Aldea</i> , <i>L-A</i> .	
**Menéndez y Pelayo, <i>Las Cien Mejores Poesías</i> , Victoriano, Victoriano Suárez, Madrid.	
Nervo, <i>Otras vidas</i> , <i>L-A</i> .	
Orrego Luco, <i>Un Idilio Nuevo</i> , <i>L-A</i> .	
** <i>Pequeño Larousse ilustrado</i> , Librería Larousse, Paris.	
Peza, Juan de Dios, <i>Poesías escogidas</i> , <i>L-A</i> .	
**Ramsey, M. M., <i>Text-Book of Modern Spanish</i> , Holt	1.80
**Reyes, A., <i>Las Dos Américas</i> , <i>L-A</i>	3.00
Rodó, R., <i>Bolívar</i> , <i>L-A</i> .....	.30
**Ross, E. A., <i>South of Panama</i> , Century, <i>L-A</i>	2.40
**Ruhl, A., <i>The Other Americans</i> , Scribner's, <i>L-A</i>	2.00
**Sarmiento, <i>Facundo</i> , <i>L-A</i> .	
**Shepherd, W. R., <i>Latin America</i> , Holt, <i>L-A</i> .....	.50

- **Ugarte, M., *La Joven Literatura Hispanoamericana, L-A.*
 *Velasco, C., *Aspectos nacionales, L-A*\$ 1.20

PHONOGRAPHS

The use of the phonograph for supplementary practice in hearing the language is strongly recommended. Phonographs and records may be obtained from the Cortina Academy of Languages, 12 East 46th St., New York, and from other companies. Each school should have a complete equipment.

GERMAN LANGUAGE AND LITERATURE

REFERENCE GRAMMARS, DICTIONARIES, ETC.

- Behagel, Otto, *Die deutsche Sprache*, 5th Ed., 1911, Leipzig, G. Freytag 1.00
 Borchardt, W., *Die sprichwörtlichen Redensarten im deutschen Volksmunde erläutert*, Neu bearbeitet von C. Wustmann, 2nd Ed., 1894, Leipzig, Brockhaus 1.75
 Büchmann, G., *Geflügelte Worte: Der Zitatenschatz des deutschen Volkes*, 1915, Berlin, A. Weichert75
 **Curme, G. O., *A Grammar of the German Language*, 1911, New York, Macmillan 3.50
 Diekhoff, Tobias, *The German Language, Outlines of its Development*, 1914, New York, Oxford 1.25
 **Duden, Konrad, *Rechtschreibung der deutschen Sprache und der Fremdwörter*. (This work replaces Duden's *Orthographisches Wörterbuch*.), 9th Ed., 1915, Leipzig, Bibliographisches Institut.65
 Eberhard, J. A., *Synonymisches Handwörterbuch der deutschen Sprache*, Ed. by O. Lyon, 17th Ed., 1910, Leipzig, Th. Grieben 3.40
 *Hasting, F. E., *Studies in German Words and their Uses*, 1911, Heath 1.00
 **Hempl, G., *German Orthography and Phonology*, 1897, Ginn... 2.00
 Hölzel's Wandbilder (for conversational practice), Wien, Eduard Hölzel, each 1.85
 Heyne, M., *Deutsches Wörterbuch*, 3 Vols., 2nd Ed., 1905-1906, Leipzig, S. Hirzel 9.75
 Hoffman, P. F. L., *Wörterbuch der deutschen Sprache*, 7th Ed., 1910, Leipzig, F. Brandstetter 1.05
 **von Jagemann, H. C. G., *Elements of German Syntax, with Special Reference to Prose Composition*, 1892, New York, Holt80
 *Kluge, F., *Etymologisches Wörterbuch der deutschen Sprache*, 7th Ed., 1909-1910, Strassburg, K. J. Trübner 2.50
 Meras, A., *Ein Wortschatz*, Heath25

**Muret-Sanders, <i>Encyclopädisches Wörterbuch der englischen und deutschen Sprache</i> , Hand- und Schulausgabe, Rev. 1908, Berlin, Langenscheidt (German-English and English-German bound separately, \$2.00 each)	\$ 3.75
Prehn, A., <i>A Practical Guide to a Scientific Study of the German Vocabulary</i> , 1912, New York, Oxford .....	.75
**Prokosch, E., <i>The Sounds and History of the German Language</i> , 1916, Holt	1.75
**Rausch, <i>Lauttafeln für den Sprachunterricht</i> , Marburg, Elwert	7.50
**Rausch, <i>Lauttafeln für den Sprachunterricht</i> , Handausgabe (postcard size), Marburg, Elwert .....	.50
Viëtor, W., <i>Die Aussprache des Schriftdeutschen</i> , 8th Ed., 1911, Leipzig, O. R. Reisland .....	.55
**Viëtor, W., <i>Deutsches Aussprachewörterbuch</i> (Should be in the possession of every teacher and every library.), 2nd Ed., 1915, Leipzig, O. R. Reisland	3.40
*Viëtor, W., <i>Deutsche Lauttafeln</i> (on rollers), Marburg, N. G. Elwert	1.25
Viëtor, W., <i>Wie ist die Aussprache des Deutschen zu lehren?</i> , 1906, Marburg, .....	.15
HISTORY OF GERMAN LITERATURE, CRITICISM, ETC.	
Bellerman, L., <i>Schillers Dramen</i> . Neue Ausgabe (the best commentary on Schiller), 3 Vols., 4th Ed., 1908, Berlin, Weidmann	5.00
*Bielschowski, A., <i>Goethe, Sein Leben und seine Werke</i> , 2 Vols., 26th Ed., 1913, München, C. H. Beck	3.50
Bielschowski, A., <i>The Life of Goethe</i> , Tr. by W. A. Cooper, 3 Vols., 1905-1908, New York, Putnam	10.00
Borinski, K., <i>Deutsche Poetik</i> , Leipzig, G. J. Göschen .....	.25
Breul, K., <i>A Handy Bibliographical Guide to the Study of the German Language and Literature for the Use of Students and Teachers of German</i> , 1895, C. Schoenhof, Boston .....	.65
Bulthaupt, H. A., <i>Dramaturgie des Schauspiels</i> (brief analyses and appreciations), Oldenburg, Schulze, I. Lessing, Goethe, Schiller, Kleist, 13th Ed., 1912	1.75
III. Grillparzer, Hebbel, Ludwig, Gutzkow, Laube, 9th Ed., 1911	1.50
IV. Ibsen, Wildenbruch, Sudermann, Hauptmann, 6th Ed., 1909	1.75
Ehrhard, A. u. Neckar, M., <i>Franz Grillparzer, Sein Leben und seine Werke</i> , 2nd Ed., 1910, München, C. H. Beck	1.90
*Francke, K., <i>A History of German Literature</i> (from the point of view of the history of German culture generally), 1901, Holt	2.50
Freytag, G., <i>Die Technik des Dramas</i> , 12th Ed., 1912, Leipzig, S. Hirzel	1.50

*Kluge, H., <i>Geschichte der deutschen Nationalliteratur</i> , 45th Ed., 1913, Altenburg, O. Bonde	\$.65
Könnecke, G., <i>Bilderatlas zur Geschichte der deutschen National-literatur</i> , 2nd Ed., 1912, Marburg, N. G. Elwert	7.00
*Krüger, H. A., <i>Deutsches Literatur-Lexikon</i> (Gives sketches of authors, lists of their works, and the principal books on both.), 1914, München, Beck	1.60
Kühnemann, E., <i>Schiller</i> , 4th Ed., 1911, München, C. H. Beck..	1.65
Kühnemann, E., <i>Schiller</i> , Tr. from the 3rd German Ed. by Katherine Royce, 2 Vols., 1912, Ginn	3.00
*Kummer, F., <i>Deutsche Literaturgeschichte des neunzehnten Jahrhunderts</i> (excellent as a general introduction and for reference), 2nd Ed., 1910, Dresden, C. Reissner	3.00
Nollen, J. S., <i>A Chronological and Practical Bibliography of Modern German Literature</i> , 1902, Scott	1.00
**Robertson, J. G., <i>A History of German Literature</i> , 1902, New York, Putnam	3.50
*Rolleston, T. W., <i>Life of Gotthold Ephraim Lessing</i> , New York, Simmons .....	.40
Sime, James, <i>Lessing</i> , 2 Vols., Scribner	5.00
*Sime, James, <i>Life of Johann Wolfgang Goethe</i> , New York, Simmons .....	.40
Thomas, Calvin, <i>A History of German Literature</i> , 1909, London, W. Heinemann	1.50
*Thomas, Calvin, <i>The Life and Works of Friedrich Schiller</i> , Student's Ed., 1901, Holt	1.50
**Vogt und Koch, <i>Geschichte der deutschen Literatur</i> , 2 Vol., 3rd Ed., 1910, Leipzig, Bibliographisches Institut	5.00
Weitbreit, Carl, <i>Deutsche Literaturgeschichte der Klassikerzeit</i> , 2nd Ed., 1908, Leipzig, G. J. Göschen .....	.45
Werner, R. M., <i>Hebbel</i> , 2nd Ed., 1913, Berlin, E. Hofmann & Co.	1.60
**Witkowski, G., <i>Das deutsche Drama des neunzehnten Jahrhunderts</i> , 4th Ed., 1913, Leipzig, B. C. Teubner.....	.35
Witkowski, G., <i>The German Drama of the Nineteenth Century</i> , Tr. by L. E. Horning, Holt	1.25
**Woodbridge, Elisabeth, <i>The Drama, its Law and its Technique</i> (a lucid and succinct presentation of Freytag's <i>Technik des Dramas</i>), Allyn .....	.80

ANTHOLOGIES AND EDITIONS OF INDIVIDUAL AUTHORS

The list below represents merely a nucleus to which should be added from time to time other standard works of German literature selected from excellent but inexpensive series such as the following:

Cottasche *Bibliothek der Weltliteratur* (with introductions),
 Stuttgart, J. G. Cotta, per volume25

Meyer's <i>Klassiker Ausgaben</i> (with introductions and notes), Leipzig, Bibliographisches Institut, per volume	\$.50
<i>Deutsche National-Literatur</i> , Stuttgart, Union Deutsche Verlags- gesellschaft (with introductions and notes), per volume..	.90
In the following list these editions are indicated by the abbrevia- tions <i>Cotta</i> , <i>Meyer</i> , <i>DNL</i> . Wherever specific titles are not given, the editions comprise the author's collected works.	
Chamisso, A. V., Ed. by H. Tardel, 3 Vols., Meyer	1.50
Collitz, Klara H., <i>Selections from Early German Literatur</i> , 1910, American	1.00
Collitz, Klara H., <i>Selections from Classical German Literature</i> (from the Reformation to the beginning of the Nineteenth Century), 1914, New York, Oxford	1.50
<i>Deutscher Novellenschatz</i> (excellent for collateral reading), Ed. by Paul Heyse und Hermann Kurz, 24 Vols., 1871 ff., Mün- chen, Rudolph Oldenbourg	6.00
Echtermeyer, Th., <i>Auswahl deutscher Gedichte</i> , Halle, 41st Ed., 1914, Buchhandlung des Waisenhauses	1.00
Elchendorf, J. V., Ed. by R. Dietze, 2 Vols., Meyer.....	1.00
Fouqué, F. de la Motte, Ed. by M. Koch, DNL .....	.90
*Goethe, Ed. by E. von der Hellen, "Jubiläums-Ausgabe", 41 Vols., Stuttgart, J. G. Cotta	21.00
Goethe, Johann Wolfgang von, <i>Faust</i> , Tr. by Taylor, Houghton	2.50
*Grillparzer, F., Ed. by A. Sauer, 20 Vols. in 10, Cotta	5.00
Hauff, W., Ed. by M. Mendheim, 4 Vols., Meyer	2.00
*Hebbel, Fr., Ed. by R. Specht, 6 Vols. in 3, Cotta	1.50
Heine, H., Ed. by E. Elster, 7 Vols., Meyer	4.00
Keller, G., 10 Vols., Stuttgart, J. G. Cotta	9.50
Kleist, H. V., Ed. by E. Schmidt, 5 Vols., Meyer	2.50
*Kluge, H., <i>Auswahl deutscher Gedichte</i> , 16th Ed., 1913, Alten- burg, O. Bonde	1.00
Körner, Th., Ed. by H. Zimmer, 2 Vols., Meyer	1.00
**Lessing, Ed. by G. Witkowski, 7 Vols., Meyer.....	3.50
Ludwig, Otto, Ed. by A. Bartels, 6 Vols. in 2, Leipzig, Hesse & Becker	1.25
Meyer, C. F., <i>Novellen</i> , 2 Vols., Leipzig, H. Haessel	2.50
**Müller, F. Max, <i>The German Classics from the Fourth to the</i> <i>Nineteenth Century</i> (with biographical notes, translations into modern German, and notes), 2 Vols., 1886, New York, Scribner	6.00
Rosegger, P., <i>Als ich noch der Waldbauernbub war!</i> 3 Vols., Leipzig, L. Staackmann .....	.70
Rosegger, P., <i>Schriften des Waldschulmeisters</i> , Leipzig, L. Staack- mann	1.00

**Schiller, Ed. E. von der Hellen, 16 Vols., "Säkularausgabe," Stuttgart, Cotta	\$ 8.00
Storm, Th., 5 Vols., new Ed., 1912, Braunschweig, G. Westermann	3.75
<i>Sturm und Drang, Dichtungen aus der Geniezeit</i> (Gerstenberg, Leisewitz, Lenz, Klinger, Maler Müller), Ed. by Karl Freye, 4 Vols. in 2, Leipzig, Bong & Co., Goldene Klassiker-Bibliothek	1.00
Uhland, L., Ed. by Fischer, 6 Vols. in 3, Cotta	1.50

GERMAN HISTORY, GEOGRAPHY, ETC.

Baedeker, <i>Reisehandbücher</i> , Leipzig, K. Baedeker (Berlin und Umgebungen, \$0.75; Nordost-Deutschland, Nordwest-Deutschland, Rheinländer, Süd-Deutschland, \$1.50 each), Deutschland (less detailed in 1 Vol.)	2.25
Diercke, C., und Gaebler, E., <i>Schulatlas für höhere Lehranstalten</i> , 1906, Braunschweig, Georg Westermann	1.75
**Henderson, E. F., <i>A Short History of Germany</i> , 2 Vols. in 1, 1911, New York, Macmillan	2.50
*Krüger, F. K., <i>Government and Politics of the German Empire</i> , 1915, World Book Co.	1.20
Meyer, Elard H., <i>Deutsche Volkskunde</i> , 1898, Strassburg, K. J. Trübner	1.60
Müller, D., <i>Leitfaden zur Geschichte des deutschen Volkes</i> , 11th Ed., 1899, Berlin, Franz Vahlen .....	.65
Friest, G. M., <i>Germany since 1740</i> , 1914, Ginn	1.25
Richard, Ernst, <i>History of German Civilization</i> , 1911, New York, Macmillan	2.00
Stacke, L., <i>Deutsche Geschichte</i> , 2 Vols., 7th Ed., 1896, Bielefeld, Velhagen und Klasing	6.25

MYTHOLOGY AND SAGA LORE

Grimm, J. u. W., <i>Deutsche Sagen</i> , Ed. by R. Steig, 2 Vols. in 1, 4th Ed., 1905, Berlin, Nicolaische Verlagsbuchhandlung ..	1.75
*Grimm, J. u. W., <i>Kinder-und Hausmärchen</i> , Ed. by H. Grimm and R. Steig, illustrated by L. Grimm, 32nd Ed., Stuttgart, J. G. Cotta	1.25
*Jiriczek, O. L., <i>Die deutsche Heldensage</i> , Leipzig, G. J. Göschen .....	.25
*Mogk, E., <i>Germanische Mythologie</i> , Leipzig, G. J. Göschen....	.25

REFERENCE WORKS FOR TEACHERS

Aus Nah und Fern (Eine internationale Zeitschrift für Schule und Haus, besonders für Schüler höherer Lehranstalten),

Chicago, Francis W. Parker School Press, 4 numbers a year (Oct., Dec., Feb., Apr.), \$0.70, in clubs of six or more, each.	.50
**Bagster-Collins, E. W., <i>The Teaching of German in Secondary Schools</i> , 1910, New York, The Columbia University Press..	1.50
Bahlsen, L., <i>The Teaching of Modern Languages</i> , Ginn .....	.50
<i>Bibliography of the Best Books for the Study of German in High Schools and Junior Colleges</i> , 1917, Berkeley, University of California Press	free
Bruel, K., <i>The Teaching of Modern Languages and the Training of Teachers</i> (Contains a valuable bibliography of 30 pp. entitled "The Reference Library of a School Teacher of German."), 4th Ed., 1909, New York, Putnam .....	.80
<i>Bulletin for Teachers of German</i> (Contains a valuable bibliography.) Bulletin of the University of Minnesota, Current Problems No. 8, August, 1916, Minneapolis, Minnesota ....	.25
Handschin, C. K., <i>The Teaching of Modern Languages in the U. S.</i> (Part II contains lists of works chronologically arranged on teaching of modern languages and contains also other valuable bibliographical data, pp. 107-150.), U. S. Bureau of Education Bulletin, 1913, No. 3, whole No. 510 .....	.15
<i>The High School Course in German</i> , Bulletin of the University of Wisconsin, No. 514, High School Series No. 2, September, 1912, Madison, Wisconsin .....	.10
** <i>The Modern Language Journal</i> , published by The Federation of Modern Language Teachers Associations and by The Association of Modern Language Teachers of the Central West and South, Ed. by E. W. Bagster-Collins and associates, A. Busse (business manager), Hunter College, New York, 8 numbers a year	1.50
<i>Monatshefte für deutsche Sprache und Pädagogik</i> , Organ des Nationalen Deutschamerikanischen Lehrerbundes, Ed. by Max Griebisch and E. C. Roedder, Verlag, National German-American Teachers' Seminary, Milwaukee, 10 numbers per year	1.50
*Prokosch, E., <i>The Teaching of German in Secondary Schools</i> (an excellent discussion of the direct method with many practical suggestions for utilizing it in the class room), Bulletin of the University of Texas, 1915, No. 41, July 20, 1915, Austin, Texas .....	.10
** <i>Report of the Committee of Twelve of the Modern Language Association of America</i> , 1898 (Important, but now somewhat antiquated in the discussion of methods. A revised edition is being prepared by a new Committee of Twelve), 1900, Heath .....	.16

- **Suggestions and References for Modern Language Teachers* (a storehouse of detailed information), Bulletin of the University of Illinois, School of Education, 1917, No. 18, Second Ed. Rev. and Enlarged, June 25, 1917, Urbana, Illinois \$.25

AIDS TO THE GERMAN CLUB

- Allen, P. S., *Hints on the Teaching of German Conversation* (games, exercises, songs), Ginn10
- Allen, P. S., and Phillipson, P. H., *Easy German Conversation* (Introduction of 54 pp. includes suggestions for forming and conducting a German Club, directions for games of forfeits, subjects of conversations, etc.), Holt90
- Autcalt, Adele Meyer, "Der Deutsche Verein" in *Aus Nah und Fern*, October, 1916, p. 21 (Includes "Satzungen des Deutschen Vereins", a most excellent Constitution for any club to adopt.), Chicago, Francis W. Parker School Press .20
- Deutsches Liederbuch für Amerikanische Studenten* (the standard work of its kind in America), Heath75
- Jäschke, R., *English-German Conversational Dictionary*, London, W. Lockwood & Co.75
- Scherer, P. and Dirks, L. H., *Deutsche Lieder* (a good shorter collection), American25
- Young, Caroline M., "The German Club" in *The Modern Language Journal*, March, 1917 (Suggests many games, gives simple forms used by the president in conducting the meeting.).

SHORT DRAMAS FOR PRESENTATION

- Benedix, R., *Die Hochzeitsreise*, Heath25
- Manley and Allen, *Four German Comedies* (Rosen, Ein Knopf; Moser, Ein amerikanisches Duell; Müller, Im Wartesalon erster Klasse; Pohl, Die Schulleiterin), Ginn45
- Wells, B. W., *Drei kleine Lustspiele* (Benedix, Günstige Vorzeichen; Benedix, Der Prozess; Zechmeister, Einer muss heiraten), Heath30

GREEK LANGUAGE AND LITERATURE

LANGUAGE

*Goodwin, W. W., <i>Syntax of the Moods and Tenses</i> , new Ed., Ginn	\$ 2.00
Goodwin, W. W., <i>Greek Grammar</i> , Ginn	1.50
Hadley, James, and Allen, F. D., <i>Greek Grammar</i> , American..	1.50
*Lindell, H. G., and Scott, R., <i>Greek-English Lexicon</i> , American	10.00
Intermediate Ed.	3.50
Sandys, J. E., and Nettleship, <i>Dictionary of Classical Antiquities</i> , Sonnenschein	
*Smith, William, <i>Dictionary of Greek and Roman Antiquities</i> , American	4.25
*Veitch, <i>Greek Verbs Irregular and Defective</i> , 1887, Oxford Univ.	

HANDBOOKS FOR REFERENCE

Gow, J. A., <i>Companion to School Classics</i> , Macmillan	2.00
*Hekler, A., <i>Greek and Roman Portraits</i> , Putnam	7.50
*Klepert, H., <i>Atlas Antiquus</i> , Stechert	1.75
Morgan, M. H., <i>Addresses and Essays</i> , American	1.50
Rich, A., <i>Dictionary of Greek and Roman Antiquities</i> , Longmans	2.50
*Schreiber, Th., <i>Atlas of Classical Antiquities</i> , Macmillan	6.00
Schreiber, Th., <i>Atlas of Ancient and Classical Geography</i> , Every- man, Dutton .....	.50
Schreiber, Th., <i>A Smaller Classical Dictionary</i> , Everyman, Dut- ton .....	.50
Tarbell, F. B., <i>History of Greek Art</i> , Chatuagua Press	1.00
Tolman, H. C., <i>The Art of Translating</i> , B. F. Sanborn70
*Whibley, <i>Companion to Greek Studies</i> , Cambridge Univ. Press	4.50

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*Forsyth, W., <i>Life of Cicero</i> , (treatment in great detail; literary and historical; still a standard), 1865, Scribner	\$ 2.50
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Slides may be obtained from Dr. A. S. Xooley, Auburndale, Mass., who has a large collection from Italy and Greece (40 cents each). He is agent also for the Rhomaldes views (an excellent collection, 8½x-11½ at 30 cents each).

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*Ziwet, A., and Field, P., <i>Introduction to Analytical Mechanics</i> , 1912, Macmillan 1.60

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Young, J. W., and Morgan, F. M., *Elementary Mathematical Analysis* (in preparation), Ed. by E. R. Hedrick, 1917, Macmillan, These books are not suggested as texts, but as reference books.

PRACTICAL MATHEMATICS

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*Ganong, W. F., <i>The Teaching Botanist</i> , Ed. 2, Macmillan	1.50
**Ganong, W. F., <i>A Text-book of Botany for Colleges</i> , Part 1, 1916, Macmillan	2.00
**Georgia, Ada E., <i>A Manual of Weeds</i> , 1914, Macmillan	2.00
Giltner, W., <i>Laboratory Manual in General Microbiology</i> , 1916, Wiley	2.50
Goff, E. S., Moore, J. G., and Jones, L. R., <i>The Principles of Plant Culture</i> , 1916, Macmillan	1.25
Green, J., Reynolds, <i>The Soluble Ferments and Fermentation</i> , Ed. 2, 1901, Cambridge Univ. Press	3.00
**Green, J. Reynolds, <i>An Introduction to Vegetable Physiology</i> , 1911, Blakiston	3.00
*Grout, A. J., <i>Mosses With Hand Lens and Microscope</i> , 1903, Ed. 2, author at Brooklyn	6.25
**Grout, A. J., <i>Mosses with a Hand Lens</i> , Ed. 2, author, New Dorp. Richmond Co., N. Y.	1.75
**Haas, P., and Hill, T. G., <i>An Introduction to the Chemistry of Plant Products</i> , 1913, Longmans, N. Y.	2.25
**Haberlandt, G., <i>Physiological Plant Anatomy</i> , 1914, Macmillan	6.50
Hard, M. A., <i>Mushrooms</i> , 1908, author, Kirkwood, Mo.	4.75
Hitchcock, A. S., <i>A Text-book of Grasses</i> , 1914, Macmillan	1.50
**Hough, R. B., <i>Handbook of Trees of Northern States and Canada</i> , author, 1907, Lowville, N. Y.	6.00
*Jordan, E. O., <i>A Text-Book of General Bacteriology</i> , Ed. 4, 1914, Saunders	3.00
**Jost, L., <i>Lectures on Plant Physiology</i> , 1907, Oxford Press	6.75
*Keeler, Harriet L., <i>Our Northern Shrubs</i> , 1910, Scribners	2.00
*Keeler, Harriet L., <i>Our Native Trees</i> , 1902, Scribners	2.00
Leavitt, R. G., <i>Outlines of Botany</i> , 1901, American	1.00
*Lipman, J. G., <i>Bacteria in Relation to Country Life</i> , Ed. 2, 1909, Macmillan	1.50
*Marshall, C. E., <i>Microbiology</i> , 1911, Blakiston	2.50
*Osterhout, W. J. V., <i>Experiments with Plants</i> , Macmillan	1.25
Parsons, Frances T., <i>How to Know Ferns</i> , Scribners	1.50
*Piper, C. V., <i>Forage Plants and their Culture</i> , 1915, Macmillan	1.75
**Punnett, R. C., <i>Mendelism</i> , Ed. 3, Macmillan	1.25
**Robinson, B. L., and Fernald, <i>Gray's New Manual of Botany</i> , Ed. 7, 1908, American	2.50
Romanes, G. J., <i>Darwin and After Darwin</i> , Vol. I (the Darwinian theory), 1910, Open Court	4.00

Sargent, F. L., <i>Plants and Their Uses</i> , 1913, Holt	\$.75
**Schimper, A. F. W., <i>Plant Geography</i> , Tr. by Fischer, 1903, Oxford Press	12.75
*Scott, D. H., <i>The Evolution of Plants</i> , 1911, Holt .....	.82
**Stevens, F. L., <i>The Fungi Which Cause Plant Disease</i> , 1913, Macmillan	4.00
**Stevens, F. L., and Hall, J. G., <i>Diseases of Economic Plants</i> , 1910, Macmillan	2.00
Stevens, W. C., <i>Introduction to Botany</i> , 1906, Heath	1.50
**Stevens, W. C., <i>Plant Anatomy</i> , Ed. 2, Rev., 1910, Blakiston..	2.00
**Strasburger, E., and others, <i>Text-book of Botany</i> , Eng. Ed. 4, Tr. by W. H. Lang, 1912, Macmillan	5.00
*Vries, H. de, <i>Plant Breeding, Comments on the Experiments by Nilsson and Burbank</i> , 1907, Open Court	1.50
*Vries, H. de, <i>Species and Varieties: Their Origin by Mutation</i> , Ed. 2, 1906, Open Court	5.00
Vries, H. de, <i>The Mutation Theory</i> , 2 Vols., 1909, Open Court	8.00
**Walter, H. E., <i>Genetics, An Introduction to the Study of Heredity</i> , 1913, Macmillan	1.50
**Waters, C. E., <i>Ferns</i> , Holt	3.00
West, G. S., <i>A Treatise on the British Fresh-water Algae</i> , 1904, Putnam	3.50

In addition, various bulletins of the U. S. Dept. of Agriculture, particularly the bulletins of the Bureau of Plant Industry, Farmers' bulletins and the Dept. of Agriculture bulletins, contain valuable information and, so far as possible, should be secured.

GENERAL BACTERIOLOGY

*Bayliss, W. M., <i>Nature of Enzyme Action</i> , 1914, Longmans....\$	.90
**Buchanan, R. E., and Estelle D., <i>Household Bacteriology</i> , Macmillan	2.40
**Conn, H. W., <i>Agricultural Bacteriology</i> , Ed. 2, 1887, Blakiston ..	2.50
*Conn, H. W., <i>Bacteria in Milk and Its Products</i> , 1903, Blakiston	1.25
DeBary, H., <i>Lectures on Bacteria</i> , Ed. 2, 1887, Oxford	1.50
Ellis, David, <i>Outlines of Bacteriology</i> , 1909, Longmans	2.50
Euler, Hans, <i>General Chemistry of the Enzymes</i> , Tr. by Thomas H. Pope, 1912, Wiley	3.00
*Eyre, J. W. H., <i>Bacteriological Technique</i> , Ed. 2, 1913, Saunders	3.00
Fischer, Alfred, <i>Structure and Functions of Bacteria</i> , Tr. by A. Coppen Jones, 1900, Oxford	2.50
Fowler, G. J., <i>Introduction to Bacteriological and Enzyme Chemistry</i> , 1911, Longmans	2.10
*Frost, W. D., and McCampbell, E. F., <i>A Text-book of General Bacteriology</i> , 1910, Macmillan	1.60

*Hawk, P. B., <i>Physiological Chemistry</i> , Ed. 4, 1912, Blakiston ..	\$ 2.50
**Jordan, Edwin O., <i>General Bacteriology</i> , Ed. 4, 1914, Saunders	3.00
Kinnicutt, L. P., Winslow, C. E. A., and Pratt, R. W., <i>Sewage Disposal</i> , 1910, Wiley	3.00
**Lipman, J. G., <i>Bacteria in Relation to Country Life</i> , Ed. 2, Macmillan	1.25
McFarland, Joseph, <i>Pathogenic Bacteria and Protozoa</i> , Ed. 7, 1912 Saunders	3.50
**Marshall, C. E., <i>Microbiology</i> , Ed. 2, 1917, Blakiston	2.50
*Muir, Robert, and Ritchie, James, <i>Manual of Bacteriology</i> , Ed. 6, 1913, Macmillan	3.25
*Percival, John, <i>Agricultural Bacteriology</i> , 1910, Duckworth ..	2.00
**Prescott, S. C., and Winslow, C. E. A., <i>Elements of Water Bacteriology</i> , Ed. 3, 1913, Wiley	1.50
**Reed, H. S., <i>Manual of Bacteriology</i> , 1914, Ginn	1.25
Ritchie, J. W., <i>Primer of Hygiene and Sanitation</i> , 1913, World Book Co. ....	.70
*Russell, H. L., and Hastings, E. G., <i>Agricultural Bacteriology</i> 1915, author, Madison, Wis.	1.25
Russell, H. L., and Hastings, E. G., <i>Dairy Bacteriology</i> , Ginn ..	1.00
Savage, William G., <i>The Bacteriological Examination of Water Supplies</i> , 1906, Blakiston	2.50
*Savage, William G., <i>The Bacteriological Examination of Food and Water</i> , 1914, Putnam	2.25
*Savage, William G., <i>Milk and the Public Health</i> , 1912, Macmillan	3.25
*Smith, Erwin F., <i>Bacteria in Relation to Plant Diseases</i> , **Vols. I, 1905; II, 1911; III, 1914, Carnegie Institution,	15.00

ZOOLOGY

GENERAL WORKS

A library adequate for college work should contain not only standard text-books similar to the texts regularly adopted for the courses in zoology, but also a reasonable number of more advanced text and reference books for the regular use of the teacher and for reference by students as the need arises. Without a considerable number of such reference works and a few current journals, the work should not be attempted. It is important also that books be added each year upon the request of the teacher.

GENERAL TEXTS

**Abbott, J. F., <i>General Biology</i> , 1914, Macmillan	\$ 1.10
**Borrodale, L. A., <i>Manual of Zoology</i> , 1912, Oxford Univ. Press	4.00

**Calkins, G. N., <i>Biology</i> , 1917, Holt	\$ 1.75
**Crampton, H. E., <i>The Doctrine of Evolution</i> , 1911, Columbia University Press	1.50
**Dendy, A., <i>Outlines of Evolutionary Biology</i> , 1912, Appleton..	3.50
**Galloway, T. W., <i>Text-book of Zoology</i> , Ed. 3, 1915, Blakiston..	2.00
**Hegner, R. W., <i>College Zoology</i> , 1912, Macmillan	2.60
**Hegner, R. W., <i>Introduction to Zoology</i> , 1910, Macmillan	1.90
*Herbert, S., <i>First Principles of Evolution</i> , 1913, London, A. C. Black	1.25
**Hertwig, R., <i>General Principles of Zoology</i> , 1897, Holt	1.60
**Hertwig, R., Ed. by J. S. Kingsley, <i>A Manual of Zoology</i> , 1912, Holt	3.00
**Holmes, S. J., <i>Studies in Animal Behavior</i> , 1916, Badger....	2.50
**Holmes, S. J., <i>The Biology of the Frog</i> , 1906, Macmillan....	1.60
**Howes, G. B., <i>Atlas of Practical Zoology</i> , 1902, Macmillan....	2.50
*Jordan, D. S., and Kellogg, V. S., <i>Animal Life; A First Book of Zoology</i> , 1900, Appleton	1.20
*Jordan, D. S., and Heath, H., <i>Animal Forms: A Second Book of Zoology</i> , 1902, Appleton	1.20
*Jordan, D. S., Kellogg, V. L., and Heath, H., <i>Animals</i> (consisting of <i>Animal Life</i> and <i>Animal Forms</i> , bound in one volume), 1903, Appleton	1.80
**Jordan, D. S., and Kellogg, V. L., <i>Evolution and Animal Life</i> , 1907, Appleton	2.50
**Kellicott, W. E., <i>Chordate Development</i> , 1913, Holt	2.50
**Kellicott, W. E., <i>General Embryology</i> , 1913, Holt	2.50
**Kingsley, J. S., <i>Comparative Anatomy of Vertebrates</i> , 1912, Blakiston	2.25
**Linville, H. R., and Kelly, H. A., <i>A Text-book in General Zoology</i> , 1906, Ginn	1.50
*McFarland, J., <i>Biology, General and Medical</i> , Saunders	1.75
**Needham, J. G., <i>General Biology</i> , 1910, Comstock	2.60
**Needham, J. G., and Lloyd, J. T., <i>Life of Inland Waters</i> , 1916, Comstock	3.00
*Osborn, H., <i>Economic Zoology</i> , 1908, Macmillan	2.00
**Parker, T. J., <i>Elementary Biology</i> , Macmillan	3.50
**Parker, T. J., and W. N., <i>Practical Zoology</i> , Ed. 4, Macmillan	3.50
**Parker, T. J., and Haswell, W. A., <i>A Text-book of Zoology</i> , Ed. 2, 2 vols., 1910, Macmillan	9.00
*Sedgwick, W. T., and Wilson, E. B., <i>General Biology</i> , Ed. 2, 1895, Holt	1.75
*Shipley, A. E., and MacBride, E. W., <i>Zoology</i> , 1904, H. K. Lewis	2.75
*Smallwood, W. M., <i>A Textbook of Biology</i> , 1913, Lea	2.75
**Thomson, J. A., <i>The Story of Animal Life</i> , Scribner	1.50

- *Thomson, J. A., *The Science of Life*, 1900, Stone\$ 1.75
 **Wilder, H. F., *History of the Human Body*, 1909, Holt 3.00

LABORATORY MANUALS, ETC.

- Curtis, W. C., *Laboratory Directions in General Zoology*, 1913,
 Co-Operative Store, Columbia, Missouri60
 **Eggeling, O., and Ehrenberg, F., *The Fresh-water Aquarium
 and Its Inhabitants*, Holt 2.00
 Givler, J. P., *Laboratory Directions in General Biology*, Ed. 2,
 1914, Pub. by author, Winfield, Kansas75
 Harglitt, C. W., and G. T., *Outlines of General Biology*, Ed. 2,
 1917, Publ. Syracuse Univ., Syracuse, N. Y. 1.00
 **Osburn, R. C., *The Care of Home Aquaria*, 1915, N. Y. Zoologi-
 cal Society25
 Pratt, H. S., *Vertebrate Zoology*, 1905, Ginn 1.50
 Pratt, H. S., *Invertebrate Zoology*, Rev. Ed., Ginn 1.25
 Sigerfoos, C. P., *Laboratory Directions in General Zoology*, 1914,
 N. W. School Supply Company, Minneapolis50
 Townsend, C. H., *The Cultivation of Fishes in Natural and Arti-
 ficial Ponds*, 1915, N. Y. C. The Aquarium20
 *Wright, A. H., and Allen, A. H., *Zoology Field Note-book; Pt.
 I, Birds, Pt. II, Fishes, Amphibians, Reptiles and Mammals*,
 1913, Pub. by authors, Ithaca, N. Y.
 **Bausch and Lomb Optical Company, and Spencer Lens Com-
 pany, *Manuals of Microscopy*, published as advertising mat-
 ter

MISCELLANEOUS INVERTEBRATES

- **Calkins, G. N., *The Protozoa*, Macmillan 3.00
 **Darwin, C., *The Formation of Vegetable Mould*, 1892, Appleton 1.50
 **Huxley, T. H., *The Crayfish*, 1895, Appleton 1.75
 **Jennings, H. S., *The Behavior of the Lower Organisms*, 1906,
 Macmillan 3.00
 **Kellogg, J. L., *Shell-fish Industries*, 1910, Holt 1.75
 *Marshall, C. E., *Microbiology*, 1912, Blakiston 2.50
 *Mayer, A. G., *Sea Shore Life:—The Invertebrates of the New
 York Coast (Series N. Y. Aquarium)*, 1915, N. Y. C. The
 Aquarium 1.20
 **Pratt, H. S., *Common Invertebrate Animals (exclusive of in-
 sects)*, 1916, McClurg 3.50

INSECTS, ETC.

- **Comstock, J. H., *Insect Life*, Comstock 1.75
 *Comstock, J. H., *Manual for the Study of Insects*, 1909, Com-
 stock 3.75
 *Ealand, C. A., *Insects and Man*, 1915, Century 3.50

Emerton, J. H., <i>Spiders, Their Structure and Habits</i> , 1890, Whidden	\$ 1.50
**Fabre, J. H., <i>The Life of the Spider</i> , 1915, Dodd Mead	1.50
**Folsom, J. W., <i>Entomology with Special Reference to its Biological and Economic Aspects</i> , 1906, Blakiston	3.00
**Hewitt, C. Gordon, <i>The House Fly, Musca domestica, its Structure, Habits, etc.</i> , 1916, Cambridge Univ. Press . . . . .	.25
**Holland, W. J., <i>The Butterfly Book</i> , 1899, Doubleday	3.00
**Holland, W. J., <i>The Moth Book</i> , 1903, Doubleday,	4.00
**Howard, L. O., <i>The Insect Book</i> , 1902, Doubleday	3.00
**Howard, L. O., <i>Mosquitoes</i> , 1901, McClure	1.50
**Kellogg, V. L., <i>American Insects</i> , 1905, Holt	5.00
*McCook, H. C., <i>Ant Communities</i> , 1909, Harpers	2.00
*Miall, L. C., <i>Natural History of Aquatic Insects</i> , 1895, Macmillan	1.75
**Peckham, G. W., and E. G., <i>Wasps, Social and Solitary</i> , 1905, Houghton	1.50
Phillips, E. F., <i>Beekkeeping</i> , 1916, Macmillan	2.00
*Sanderson, E. D., and Jackson, C. F., <i>Elementary Entomology</i> , 1912, Ginn	2.00
**Weed, C. M., <i>Life Histories of American Insects</i> , 1906, Macmillan	1.50

MISCELLANEOUS ON VERTEBRATES

*Dickerson, M. C., <i>The Frog Book</i> , 1906, Doubleday	4.00
Jordan, D. S., <i>A Guide to the Study of Fishes</i> , 1905, Holt	12.00
**Jordan, D. S., <i>Manual of the Vertebrates of the Northern United States</i> , Ed. 9, 1900, McClure	2.50
**Jordon, D. S., and Evermann, B. W., <i>American Food and Game Fishes</i> , 1902, Doubleday	4.00
*Osborn, H. F., <i>The Age of Mammals</i> , 1910, Macmillan	4.50
*McMurrich, J. P., <i>The Development of the Human Body</i> , Ed. 5, 1915, Blakiston	2.50
**Prentiss, Chas. W., <i>Laboratory Manual and Text-book of Embryology</i> , 1915, Saunders	3.75
*Williston, S. W., <i>Water Reptiles of the Past and Present</i> , 1916, Univ. of Chicago Press	3.00

BIRDS

**Apgar, A. C., <i>Birds of the United States East of the Rocky Mountains</i> , American	2.00
*Bailey, F. M., <i>Handbook of Birds of the Western United States</i> , 1902, Houghton	3.50
**Beebe, C. W., <i>The Bird; its Form and Function</i> , 1906, Holt	3.50
Blanchan, N., <i>Birds that Hunt and Are Hunted</i> , 1898, Doubleday	2.00

**Chapman, F. M., <i>Bird Life: A Guide to the Study of Our Common Birds</i> , 1897, Appleton, without colored plates	\$ 1.75
with colored plates	5.00
**Chapman, F. M., <i>Color Key to North American Birds</i> , 1903, Doubleday	2.50
Coward, T. A., <i>The Migration of Birds</i> , 1912, Cambridge Univ. Press .....	.40
*Dugmore, A. R., <i>Bird Homes</i> , 1900, Doubleday	2.00
**Eaton, H. E., <i>Birds of New York</i> , 2 Vols., 1914, N. Y. State Museum,	4.00
*Knowlton, F. H., <i>Birds of the World</i> , 1909, Holt	7.00
**Reed, C. A., <i>The Bird Book</i> , 1915, Doubleday	3.00
*Reed, C. A., <i>North American Birds' Eggs</i> , 1904, Doubleday....	2.50
**Widmann, Otto, <i>A Preliminary Catalogue of the Birds of Missouri</i> , 1907, Trans. of the Academy of Science of St. Louis, Vol. XVIII, No. 1,	
*National Association of Audobon Societies, Educational Leaflets, N. Y.	

GENETICS

*Bateson, W., <i>Mendel's Principles of Heredity</i> , Putnam	3.50
**Buttel-Reepen, H. V., <i>Man and his Forerunners</i> , 1913, Longmans	1.00
*Castle, W. E., <i>Heredity</i> , 1911, Appletons	1.50
**Clodd, E., <i>A Primer of Evolution</i> , Longmans .....	.75
**Conklin, E. G., <i>Heredity and Environment</i> , 1915, Princeton Univ. Press	1.50
Coulter, J. M., <i>Evolution, Heredity and Genetics</i> , 1915, J. G., Coulter, Bloomington, Ill. ....	.50
**Darbishire, A. D., <i>Breeding and the Mendelian Discovery</i> , 1912, Cassell	2.00
**Darwin, Chas., <i>The Origin of Species</i> , Appleton	2.00
Darwin, Chas., <i>Animals and Plants Under Domestication</i> , Appleton	5.00
**Darwin, Chas., <i>The Descent of Man</i> , Appleton	3.00
**Davenport, C. B., <i>Heredity in Relation to Eugenics</i> , 1913, Holt	2.00
*Davenport, E., <i>Principles of Breeding</i> , 1916, Ginn	2.50
*Doncaster, L., <i>Heredity in the Light of Recent Research</i> , 1912, Cambridge University Press	1.00
*Estabrook, A. H., <i>The Jukes in 1915</i> , 1916, Carnegie Inst., Washington, D. C.	2.50
*Geddes, P., and Thomson, J. A., <i>Evolution</i> , Holt .....	.75
**Goddard, H. H., <i>The Kallikak Family</i> , Macmillan	1.50
**Guyer, M. F., <i>Being Well-Born</i> , 1916, Bobbs	1.00

**Holmes, S. J., <i>The Evolution of Animal Intelligence</i> , 1911, Holt	\$ 2.75
**Kellicott, W. E., <i>The Social Direction of Human Evolution</i> , 1911, Appleton	1.50
**Kellogg, V. L., <i>Darwinism Today</i> , 1907, Holt	
*Lankester, E. R., <i>Extinct Animals</i> , 1905, Holt	1.75
**Lock, R. H., <i>Variation, Heredity and Evolution</i> , 1909, Dutton	1.50
*Lucas, F. A., <i>Animals of the Past</i> , 1901, Doubleday	2.00
Lull, R. S., <i>Organic Evolution</i> , 1917, Macmillan	3.00
**Marett, R. R., <i>Anthropology</i> , Holt . . . . .	.50
*Montgomery, T. H., <i>The Analysis of Racial Descent in Animals</i> , 1906, Holt	2.50
**Morgan, T. H., <i>Heredity and Sex</i> , 1913, Columbia Univ. Press..	
*Morgan, T. H., <i>A Critique of the Theory of Evolution</i> , 1916, Princeton Univ. Press	1.50
**Morgan, T. H., et al., <i>The Mechanism of Mendelian Heredity</i> , 1915, Holt	1.75
**Osborn, H. F., <i>Men of the Old Stone Age</i> , 1915, Scribners.	5.00
**Osborn, H. F., <i>From the Greeks to Darwin</i> , 1908, Macmillan..	2.25
Osborn, H. F., <i>The Origin and Evolution of Life</i> , 1917, Scribner..	3.00
**Punnett, R. C., <i>Mendelism</i> , Ed. 3, 1911, Macmillan	1.25
*Rignano, E., <i>On the Inheritance of Acquired Characteristics</i> , 1911, Open Court	3.00
**Romanes, G. J., <i>Darwin and After Darwin</i> , 1910, Open Court ..	4.00
*Thomson, J. A., <i>Darwinism and Human Life</i> , Holt	1.50
**Tyler, J. M., <i>Man in the Light of Evolution</i> , 1908, Appleton..	1.25
**Walter, H. E., <i>Genetics, An Introduction to the Study of Heredity</i> , 1913, Macmillan	1.50

MISCELLANEOUS BIOLOGICAL

**Bigelow, Maurice, A., <i>Sex Education</i> , 1916, Macmillan	1.25
**Brode, H. S., <i>Books on Biology for Boys and Girls</i> , Whitman, College Quarterly, Walla Walla, Wash.	free
Colton, H. S., <i>Selected Readings for Students in Elementary College Zoology</i> , 1915, Pub. by Dep't of Zoology, Univ. of Pa... .	.25
*Crile, G. W., <i>Man an Adaptive Mechanism</i> , 1915, Macmillan ..	2.75
**Dahlgren, U., and Kepner, W. A., <i>Animal Histology</i> , Macmillan	3.75
**Galloway, T. W., <i>Reproduction</i> , 1915, J. G. Coulter, Bloomington, Ill. . . . .	.60
*Hegner, R. W., <i>The Germ-Cell Cycle in Animals</i> , 1914, Macmillan	1.75
**Hodge, C. F., <i>Nature Study and Life</i> , 1902, Ginn	1.50
**Hornaday, W. T., <i>The American Natural History</i> , 1904, Scribners	3.50
**Howell, Wm. H., <i>Text-book of Physiology</i> , 1916, Saunders ..	4.00

*Huxley, J. S., <i>The Individual in the Animal Kingdom</i> , 1912, Cambridge Univ. Press	\$.75
**Huxley, T. H., <i>Lesson in Elementary Physiology</i> , Rev. Ed., 1913, Macmillan	1.60
**Huxley, T. H., <i>Collected Essays</i> , 9 Vols., Appleton	10.65
**Lankester, E. R., <i>The Kingdom of Man</i> , 1907, Holt	1.40
**Lloyd, F. E., and Bigelow, M. A., <i>The Teaching of Biology</i> , 1904, Longmans	1.50
**Locy, Wm. A., <i>Biology and Its Makers</i> , 1915, Holt	2.75
*Loeb, J., <i>The Mechanistic Conception of Life</i> , Univ. of Chicago Press	1.65
**MacFadyen, A., <i>The Cell as the Unit of Life</i> , 1908, Blakiston.	3.00
Needham, J. S., <i>Natural History of the Farm</i> , 1916, Comstock..	1.50
*Pearson, Karl, <i>The Grammar of Science</i> , Ed. 3, Macmillan, Pt. 1 (Pt. 2 in preparation),	2.00
*Starr, —, <i>The Adolescent Period</i> , 1915, Blakiston	1.00
*Stiles, P. G., <i>Nutritional Physiology</i> , 1912, Saunders	1.25
*Stiles, P. G., <i>The Nervous System and its Conservation</i> , 1915, Saunders	1.25
**Stone, W., and Cram, W. E., <i>American Animals</i> , 1902, Doubleday	3.00
**Warbasse, J. P., <i>Conquest of Disease Through Animal Experimentation</i> , 1910, Appletons	1.00
**White, A. D., <i>A History of the Warfare of Science with Theology</i> , 1910, Appleton	5.00
**Wilson, E. B., <i>The Cell in Development and Inheritance</i> , Ed. 2, Revised, Macmillan	3.50

JOURNALS

** <i>American Naturalist</i> (a monthly journal devoted especially to the factors of organic evolution), The Science Press	4.00
** <i>Journal of Heredity</i> (a monthly journal devoted to plant breeding, animal breeding and eugenics), published by the American Genetic Association	2.00
U. S. Department of Agriculture, <i>Publications</i> (many valuable pamphlets are available for free distribution).	
U. S. Bureau of Fisheries, <i>Publications</i> (many valuable pamphlets are available for free distribution).	

PHYSIOLOGY

ELEMENTARY TEXT AND REFERENCE BOOKS

*Budgett, S. P., <i>Essentials of Physiology</i> , Saunders	1.00
*Colton, B. P., <i>Physiology, Experimental and Descriptive</i> , Heath	1.15
**Fisher, L., and Fisk, E. L., <i>How to Live</i> , Funk	1.00

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**Hourticq, Louis, <i>Art in France</i> , 1911, London, Wm. Heinemann	1.50
Macfall, H., <i>The French Pastellists of XVIII Century</i> , 1909,	
Macmillan	10.50
*Mauclair, C., <i>The Great French Painters</i> , 1903, Dutton	7.00
Meynell, E., <i>Corot and his Friends</i> , 1909, Wessels	3.25
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**Muther, Richard, <i>The History of Painting from the IV to the</i>	
<i>XIX Century</i> , 2 Vols., Putnam	5.00
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Dutton	40.00
*Poore, H. R., <i>The New Tendency in Art</i> , 1913, Garden City, N.	
Y., Doubleday75
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Stanton, T., <i>Reminiscences of Rosa Bonheur</i> , 1910, N. Y., Apple-	
ton	3.00
Stranahan, C. H., <i>A History of French Painting</i> , 1902, Scribner	3.50
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MUSIC

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<i>Chemical Composition of American Food Materials</i> , U. S. Dept of Agriculture, No. 2810

<i>Food for Young Children</i> , U. S. Dept. of Agriculture, F. B. bulletin 717.	
<i>Ice Cream</i> , Vermont Station bulletin, No. 155	\$.10
<i>Preservation of Food in the Home</i> , University of Missouri bulletin, Extension Series, No. 6.	
<i>Principles of Nutrition and Nutritive Value of Food</i> , U. S. Dept. of Agriculture, F. B. bulletin, No. 142.	
<i>School Lunches</i> , U. S. Dept. of Agriculture, F. B. bulletin, No. 712.	
<i>Service of Meals</i> , University of Illinois bulletin, Urbana, Illinois	.10
A list of all available bulletins issued by the U. S. Dept. of Agriculture, Washington, D. C., should be obtained and all those of interest sent for. The library should obtain, also, all bulletins of interest announced in the U. S. Dept. of Agriculture monthly list of available bulletins. Notices of new books and bulletins appear in the <i>Journal of Home Economics</i> .	

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